

ManFriday's Mesh Grabber 2.0.0

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Features

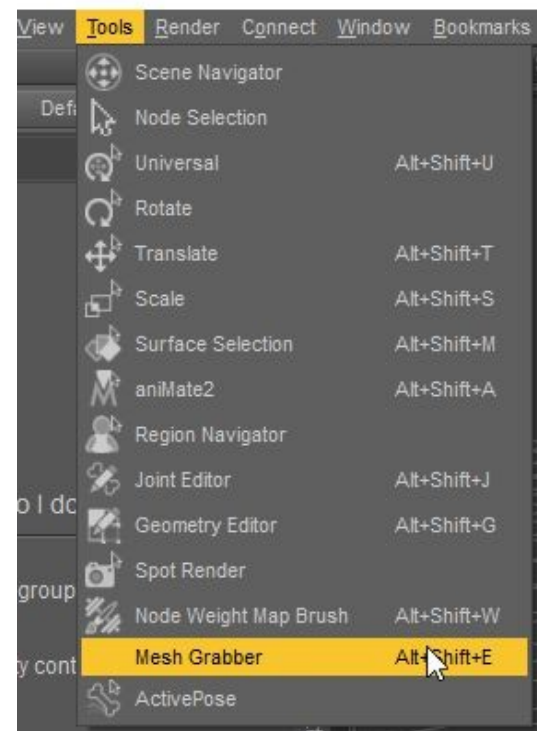
This plugin for Daz Studio 4.10, 4.11 and 4.12 adds a new “Mesh Grabber” tool to your Daz Studio’s “Tools” menu.

This tool adds actual **geometry modeling** functionality to Daz Studio. You can now select individual vertices of the objects in your scene and push and drag them around.

Mesh Grabber 1.0 was released in November 2019. Version 2.0 comes with fixes and new features and also adds support for rotations, if you have the new “Mesh Grabber Rotation Add-On” installed as well. For details, see below.

If you are familiar with Blender, the tool is imitating some of the functionality of Blender’s “Grab” and “Rotate” tools with “proportional editing” enabled. But even if you have never used Blender or any other 3D modeler, you will find this immediately useful, for example to quickly fix poke-through with clothes without having to test a lot of morphs to find one that fixes a particular problem.

If you are familiar with creating your own morphs by exporting OBJ files from Daz Studio, changing them in a modeling software and then re-importing the OBJ into Daz Studio via Morph Loader Pro: this tool saves you all that. **You can move and rotate vertices directly in Daz Studio.**

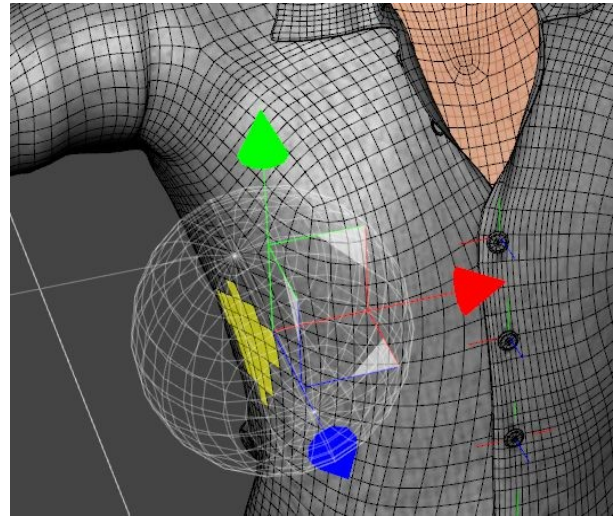


Selecting geometry

When the tool is active, you can click anywhere into an object to select it, much like you would with the “Universal” tool. Once the object has been activated, you can select individual faces in the geometry, similar to how Daz Studio’s “Geometry Editor” tool works (see picture on the right).

Similar to the Geometry Editor, you can do the following to make selection easier:

- You can hold the mouse button down after the first select to select many polys at once (“**swipe selection**”).
- If you hold down the **Ctrl** key while clicking, the tool will not remove the existing selection, but add polys to the selection instead.
- Reversely, if you hold down the **Alt** key while clicking, polys will be removed from the current selection.



If you right-click on the selection, you can also select “**Grow selection**” and “**Shrink selection**” which might make selecting larger areas easier. The Mesh Grabber tool supports the same keyboard shortcuts that work in the Daz Studio Geometry Editor (by default, Ctrl and the “+” and “-” keys).

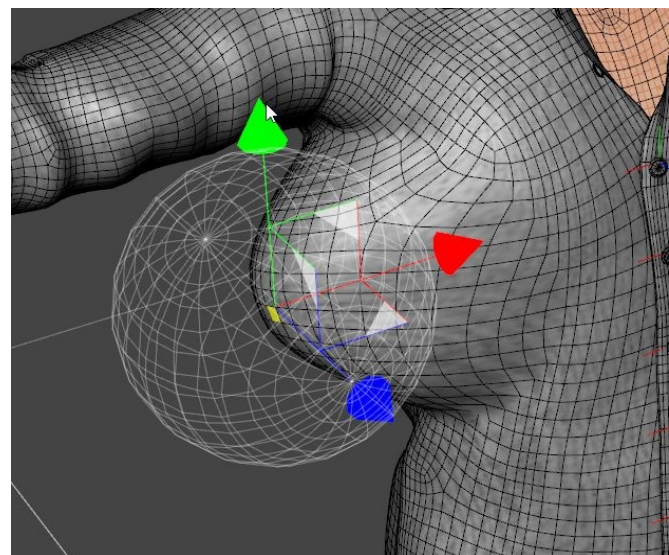
You can also switch between **polygon (face)**, **edge** and **vertex selection** with the context menu. The three modes are also shown in the Mesh Grabber’s Tool Settings pane (see below).

Note: Like the Daz Studio Geometry Editor, the Mesh Grabber tool behaves differently depending on whether something is already selected in the scene. If nothing is selected yet, then the tool will automatically select the object under the mouse and then select geometry in it. By contrast, if an object is already selected in the scene, the tool will ignore all geometry that is not in the selected node. This is intentional: for example in order to fix poke-through in clothing, you can select the piece of clothing in the scene tree first and then be sure that the tool will not pick up geometry in the figure that’s wearing the clothing, or other clothing pieces.

Dragging geometry

Once something is selected, the tool will display a **gizmo** with the three axes (X, Y, Z) and planar controls (gray triangles for the XY, XZ, YZ planes) similar to the “Universal” tool. Unlike that tool however, the gizmo of the Mesh Grabber tool will **move the vertices** you have selected *within* the object’s mesh.

The **wireframe sphere** around the gizmo’s center indicates a **falloff radius** that determines how many and how much the faces surrounding the selection will be dragged along as well: faces immediately next to the



selection will be moved strongly, whereas more distant faces within the radius sphere will be moved less.

As you can see in the **picture above**, only a single polygon was selected, but dragging it moved a lot of polygons with it.

You can change the **size of the sphere** (i.e. the falloff radius) in three ways:

- via the “Falloff radius” slider in the tool options (see below);
- by holding down the Ctrl key and moving the **mouse wheel** up or down while the tool is active;
- by using the Ctrl and PageUp or PageDown keys (by default; you can change these keyboard shortcuts in the Daz Studio “Customize” dialog – F3 key).

The Mesh Grabber’s tool options allow you to select several modes for how the falloff is computed within the radius as well (see below).

Again, this is somewhat similar to how the Blender “Grab” tool with “proportional editing” enabled operates, but even if you have never used Blender, you should find this easy to use and intuitive.

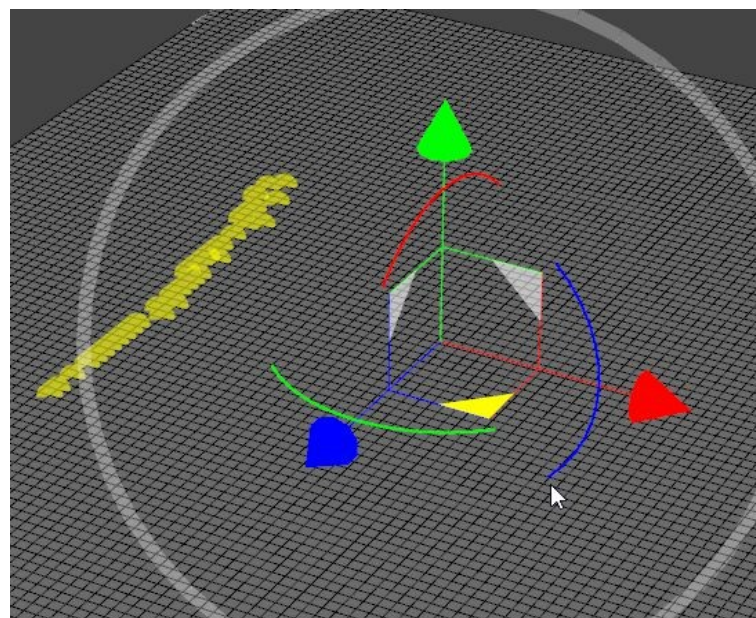
Rotations

If you have the “**Mesh Grabber Rotation Add-On**” installed, which is also available from ManFriday’s Daz Store at <https://www.daz3d.com/manfriday>, the Mesh Grabber supports rotating selected vertices around an arbitrary axis in addition to the translations (moving vertices) described above.

A typical rotation has the following steps:

1. In the “Tool Settings” pane, **select a gizmo orientation** that suits your needs. Since the tool will always rotate around one of the three gizmo axes, the gizmo orientation impacts the result of the rotation (as opposed to translations). For details, see “Tool settings” below.
2. **Hold down the Ctrl key** and drag one of its six translation handles to **position the gizmo** so that one of its three axes (X, Y and Z) is where you want the rotation to occur.

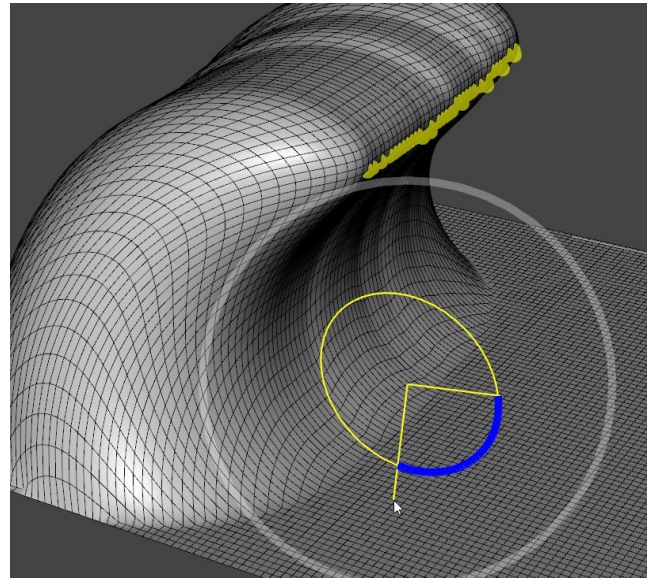
When you move the gizmo with the Ctrl key held down, it will stop positioning itself automatically when you change the camera view; the “**Lock in place**” checkbox in the Tool Settings will also be turned on.



3. **Grab one of the rotation handles** on the gizmo.
This will then rotate the selected vertices around the corresponding gizmo axis. The rotation will include the falloff radius and mode as with the translations described previously.

As you can see, rotations are a bit more complicated than translations. For *moving* vertices, the position of the gizmo is irrelevant; all that matters is an offset that should be added to the selected vertices. To *rotate* 3D mesh however, both an *axis* and an *angle* need to be defined.

Mesh Grabber uses the three gizmo axes (X, Y and Z) for rotations, like the Daz Studio Universal Tool. So when you rotate, the position of the gizmo becomes relevant: the rotation will be different depending on where the gizmo's axes are.



Tool settings

The Mesh Grabber tool has its own options in the standard Daz Studio “Tool Settings” pane.

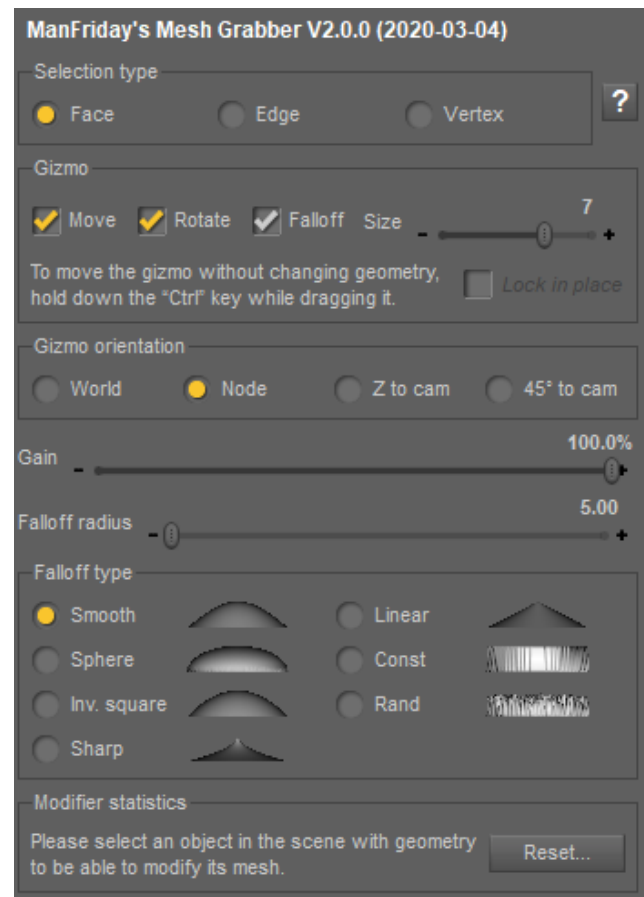
(If you don't see any “Tool Settings” in your Daz Studio anywhere, select “Window” → “Panels (Tabs)” → “Tool Settings”. This is a generic pane whose contents will change depending on which tool is currently active. Mesh Grabber adds its own settings here when it is active.)

Here you can change:

- The **selection type** (polygon (faces), edge or vertex).
- The **orientation** of the gizmo's X, Y and Z axes (along “world” axes or along the local axes of the currently selected scene node). These two will behave identically unless the current node has rotations set in its parameters.

Mesh Grabber 2.0 adds the “**Z to cam**” and “**45° to cam**” gizmo orientations here, which will keep the gizmo at a fixed angle to the camera when you rotate it. In these modes, you can therefore use the viewport camera to determine the rotation angle. (For Blender users, the “Z to cam” mode makes the tool operate like the Blender rotation tool.)

- You can **temporarily hide** the move and rotation controls of the gizmo if they seem to be in the way of your selections. There is also a slider to change the gizmo display **size**.



- The **“Lock in place”** checkbox stops the gizmo from being moved around automatically. By default, the setting is off; the gizmo will then always be placed on the vertex that is currently closest to the camera. It can therefore jump around when you move the camera or select vertices. This stops when you turn on “Lock in place”.

“Lock in place” is automatically turned on when you move the gizmo with the Ctrl key held down (to reposition it without affecting the currently selected mesh, see “Rotations” above); the setting is automatically turned off when the current selection changes.

- You can also change the display of the **falloff influence sphere** between hiding it completely, displaying it as a big empty circle (new with Mesh Grabber 2.0) or showing it as a wireframe sphere (like the original Mesh Grabber did).
- The **“Gain”** slider allows you to temporarily “weaken” the effect of the gizmo on the mesh. If you set the “gain” to less than 100%, the selected vertices will be less affected by the drag accordingly. This might be useful for more fine-grained positioning in some situations.

Most importantly, you can set the **falloff radius** with a slider here, and you can select the **method** by which the tool computes the falloff within the fall radius (see the next page).

Additionally the pane shows a few statistics about your selection and the geometry in the modifier.

Morphs

The Mesh Grabber tool creates results that are quite similar to those of a Daz Studio morph, but the tool does not actually use or create morphs. The vertex offsets that you create with the tool (the “deltas”) will be stored with each object’s geometry, but you will not see a lever in the object’s settings that allow you to turn that effect on and off or set its strength gradually.

It is however possible to convert the Mesh Grabber deltas into a morph. To create such a morph, export the object with deltas as an OBJ file using Daz Studio’s “File” → “Export” and re-import that OBJ with Morph Loader Pro (“Edit” → “Object” → “Morph Loader Pro”).

There are many good tutorials on the internet about how to do this. From the Daz forums:

- L’Adair wrote one for creating morphs from dForce results (similar process):
https://www.daz3d.com/forums/discussion/comment/3394251/#Comment_3394251
- RGcincy wrote one for creating mirror morphs with Mesh Grabber:
<https://www.daz3d.com/forums/discussion/389311/how-to-create-a-mirror-morph-for-mesh-grabber/p1>

I will probably also create an add-on to the Mesh Grabber eventually to automate this.

Falloff types

The following falloff types can be set in the “Tool settings” pane:

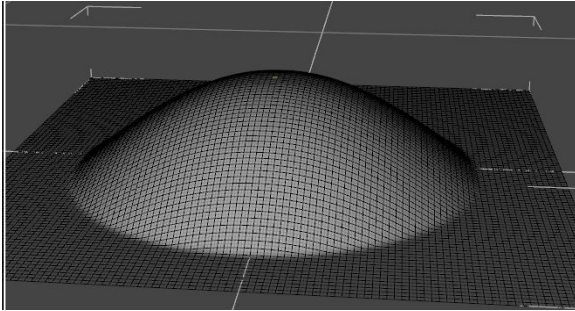


Figure 1: Smooth (curve)

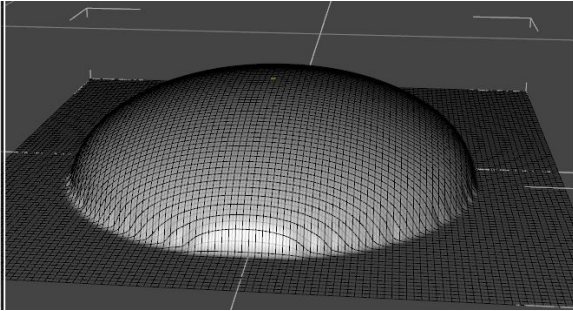


Figure 2: Sphere

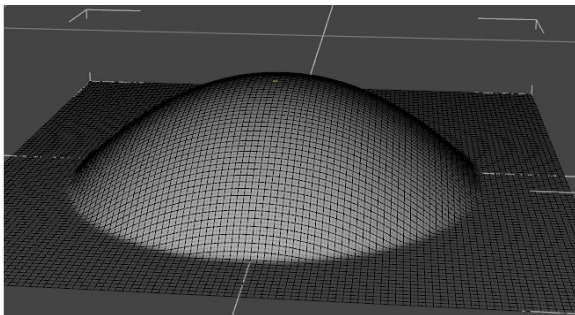


Figure 3: Inv(erse) square

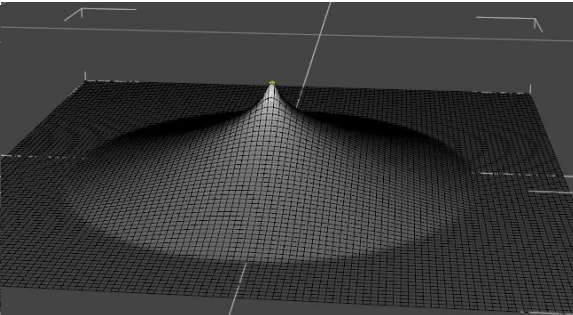


Figure 4: Sharp

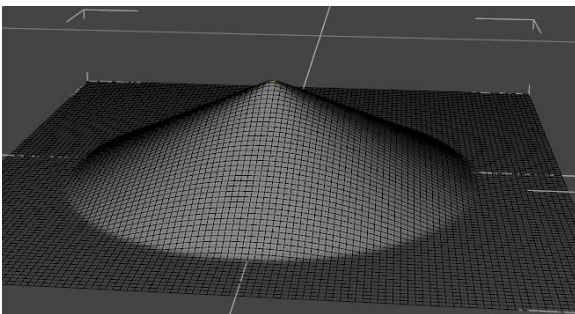


Figure 5: Linear

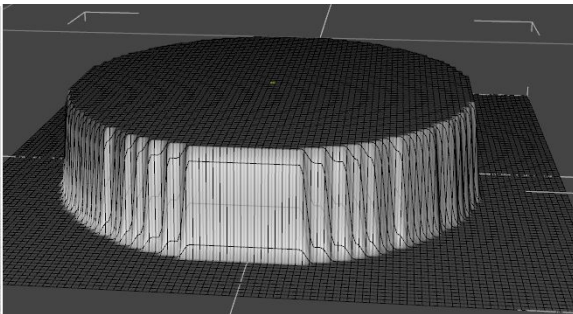


Figure 6: Const (for constant)

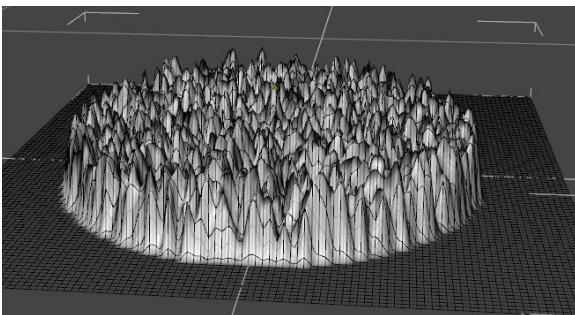


Figure 7: Rand (for random)

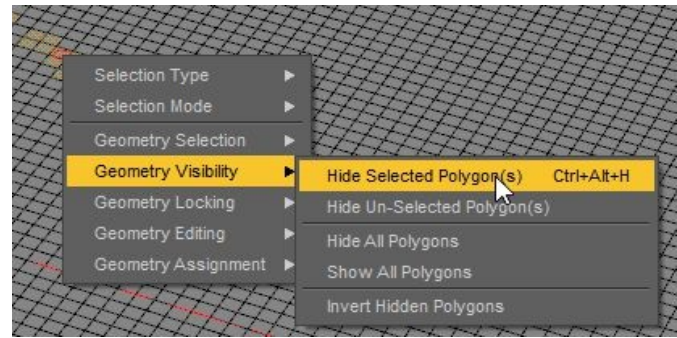
Notes

1. The higher the **density** of the mesh that the tool works on, the better the results will be. The tool can only move vertices around, and if there are not enough vertices, then the results will not be optimal. (As an extreme example, if you create a plane primitive without any subdivisions, the tool can't do anything with it except move its four corner vertices.)
2. The tool works fine with **subdivided** meshes, but it modifies only the base-resolution mesh; the subdivided mesh will be interpolated by Daz Studio as usual.
3. The changes you have made to the geometry will be **saved with your scene file** and loaded back into memory when you open the scene again.
4. To remove all changes made by the tool, right-click onto the geometry (with the tool active) and select **“Reset mesh grabber (clear all deltas)”**. This will restore the original geometry as if you had never used the Mesh Grabber on that object.
5. Internally, the Mesh Grabber plugin consists of two components: the **Mesh Grabber viewport tool** and the **Mesh Grabber geometry modifier**. (Other modifiers you might know in Daz Studio include D-Formers, dForce, and the smoothing modifier.) Like all Daz Studio modifiers, the Mesh Grabber operates on an object in the scene that has geometry. Unlike other modifiers however, there is no “Add Mesh Grabber modifier” menu item. Instead, for ease of use, the Mesh Grabber tool will automatically add the modifier to a geometry object when you start working with it. The Mesh Grabber attempts to insert itself behind all other modifiers of a scene node; as a result, it should be able to fix even the results of a dForce simulation or mesh smoothing.
6. The Mesh Grabber sometimes fights with the Daz Studio **smoothing modifier** over how to modify the mesh. The smoothing modifier seems to activate itself with a delay after you drag the mesh with Mesh Grabber. So if you see the mesh jumping back and forth erratically, turning off the smoothing modifier for the currently selected item may help.
7. Like the Geometry Editor and some other Daz Studio tools, the Mesh Grabber tool needs to **disable geografts** while it is active. It turns them back on when you switch to another tool. (The reason for this is like all Daz Studio geometry modifiers, the Mesh Grabber can move vertices around, but must assume that the number of vertices in an object stays the same. Because geografts can add or remove vertices, they need to be disabled while a modifier tool like the Mesh Grabber is active.)

This also affects **dForce Hair**: while the Mesh Grabber tool is active, all dForce Hair disappears from the scene. **If your scene's dForce hair items are mysteriously missing from your renders, change back to one of the “simple” tools like the Universal Tool before rendering.**

8. **Tip about selections:** The Mesh Grabber selection tools are not yet as flexible as the ones in the Daz Studio Geometry Editor. However, when you switch from the Geometry Editor tool to the Mesh Grabber tool, the Mesh Grabber copies all facet selections you made, and will copy them back when you switch back. This allows you to switch back and forth between the tools and use the Geometry Editor's advanced selection tools for the Mesh Grabber.

9. **Tip about masking:** Sometimes you may want to use the influence sphere for some general falloff, but would like to exclude certain parts of the current object from being influenced even though they are within the falloff radius. To help with that, Mesh Grabber 2.0 no longer moves vertices that have been hidden in the Geometry Editor. This can be used for some primitive masking: in the Geometry Editor, select faces, then select “Hide selected polygons” from the right-click menu. When you switch back to the Mesh Grabber, the hidden vertices will be left alone. You can then go back to the Geometry Editor and select “Show All Polygons”.



Differences from the **Blender** “Grab” and “Rotate” tools with “Proportional editing” enabled:

- In Blender, you can change the size of the **falloff radius** with the mouse wheel only. By contrast, with the Mesh Grabber, you have to hold down the Ctrl key while operating the mouse wheel (or else zooming in Daz Studio would become impossible with the tool active).
- In Blender, **grab** and **rotate** are separate tools (triggered with the G and R keys, respectively). The Mesh Grabber integrates both operations into the same gizmo.
- In Blender, **rotations** are always done around an invisible axis that is perpendicular to the screen. With the Mesh Grabber rotations, you can have that behavior by switching the “Gizmo orientation” to “Z to camera” and then dragging the blue rotation handle, but the Mesh Grabber rotations allow you to use other rotation axes as well.

Installation

Mesh Grabber and the Rotation Add-On are best installed using the Daz Installation Manager (DIM). To verify that the plugin has been loaded correctly, you can check “Help” → “About installed plugins”. There should be an entry called “ManFriday’s Mesh Grabber” in the list.

If you have the rotation add-on, there should be a second plugin entry called “ManFriday’s Mesh Grabber Rotation Add-On”, and the “Rotation” checkbox in the Tool Settings pane should be active.

Daz Studio should also have added a new “Mesh Grabber” menu item to your “Tools” menu. If not, to add the menu item manually, go to “Window” → “Workspace” → “Customize” (F3 hotkey by default) to bring up Daz Studio’s actions and menu customization. In the tree on the left, under “Viewport Tools”, you should see an item called “Mesh Grabber”.

In the right half of the window, click on the “Menus” tab and expand the “Main Menu Bar” item at the top. You should see the items for File, Edit, Create, Render, etc. Drag the “Mesh Grabber” into the “Tools” menu, press “Apply” and “Accept”, and you should have that action in Daz Studio’s menu.

Alternatively, in the main menu, select “Window” → “Workspace” → “Update and merge menus”. On my system that added the menu as in the screenshot, but I'm not sure that works everywhere. **That might also destroy your other custom menu items** if you have any.

Ideas for future add-ons

As we say in Europe, Rome wasn't built in a day, but now that I have my first geometry plugin working, I have plans for future extensions of this plugin.

- Scaling
- Symmetry
- More selection tools (save / restore selection, hide selected vertices, ...)
- Push / pull brush
- Mesh smoothing brush
- Spawn Daz Studio morphs directly from the deltas in the modifier without having to export as OBJ and use Morph Loader Pro
- Clear deltas in selection

Acknowledgments

A big thank you goes out to Rob Whisenant, Chris Jones and Josh Darling at Daz for tirelessly answering all my questions. This tool would not exist without their support.

Big thanks also to the many DAZ PAs and users who have tested this plugin even before it was ready. There are too many to list, but thanks in particular to barbult, RGcincy and L'Adair for testing and posting tutorials in the Daz forums. You have all been very helpful!

ManFriday's Mesh Grabber uses an icon from Font Awesome 4.7 by Dave Gandy – <http://fontawesome.io>.

Change log

- V2.0.0 (Feb 3, 2020)
 - Support for rotations in conjunction with the Mesh Grabber Rotation Add-On. Rearrange related controls in Tool Settings.
 - Allow for moving the gizmo without moving the mesh by holding down the Ctrl key. Add a “Lock in place” checkbox to tool settings dialog.
 - Fix tool icon having the wrong highlight color after activation / deactivation.
 - Fix face / edge / vertex selection having an off-yellow color instead of bright yellow in “texture shading” viewport drawing style. Make selection color slightly less opaque.

- Fix for the gizmo appearing at a large offset if the selected scene node had an internal offset defined (as visible in the Daz Studio Joint Editor).
- Fix edge and vertex selection always selecting the same edge/vertex within a poly if the geometry had any modifiers active.
- Added a “Help” button to the Tool Settings pane and a “Help” item to the context menu which should open this PDF.
- Add a compaction step that eliminates zero deltas from the modifier to speed up computation and calculations. The compaction is triggered with a three-second delay after any change has been made to the deltas and can be observed in the Tool Settings statistics after that delay.
- Fix crash when clicking on an object with a geometry shell. (The geometry of shells is computed by Daz Studio from the geometry of its source object and cannot be modified with the Mesh Grabber.)
- Fix gizmo position and sizing problems when more than one 3D viewport was visible. Some of the gizmo state is now maintained separately for each 3D viewport and no longer shared.
- Do not clear entire selection if Ctrl is held down during the click. This makes accidental mis-clicks while trying to select multiple vertices less annoying.
- Allow primitive masking by not moving vertices that have been hidden in Daz Studio Geometry Editor. See “Notes” above.
- Fix Ctrl++ etc. shortcuts for “grow selection” etc. working only sporadically after Alt key was pressed.
- Fix statistics in Tool Settings not being updated sometimes.
- Allow a falloff radius of 0 (previous minimum was 0.5).
- Made the number of the falloff radius slider editable with the keyboard.
- Added a “Reset” button to the Tool Settings pane which does the same thing as the “Reset all deltas” context menu item.
- V1.0.0 (Nov 25, 2019)
 - Version bump, submitted to the Daz store.
- V0.6.0 (Nov 21, 2019)
 - Improved documentation.
 - Separated options for “show gizmo axes” and “show gizmo sphere”, added option for gizmo size.
 - Fixed Undo getting confused when two nodes of the same name were in the scene (e.g. two G8F figures).

- Fixed Undo and mesh modifier getting very confused when drag and radius changes were applied multiple times on the same object.
- V0.5.0 (Oct 24, 2019)
 - Added the “Gain” slider.
 - Added a slider and keyboard shortcuts for changing the falloff radius.
 - Added pictures for falloff types to the tool options and a tool icon.
 - Made “grow / shrink selection”, “select all” and “clear selection” react to the same keyboard shortcuts that are configured for the Daz Studio Geometry Editor.
 - Update the gizmo position and size when the camera changes.
 - Fixed problems with edge selection on subdivided meshes.
- V0.4.1 (Oct 21, 2019)
 - Fixed all the problems with falloff changes and undo, hopefully.
- V0.4.0 (Oct 20, 2019)
 - Parallelized some of the geometry algorithms to make use of all available CPU cores (mouse-to-polygon hit testing and falloff calculation).
- V0.3.0 (Oct 18, 2019)
 - Implemented edge and vertex selection.
 - Added planar controls (gray triangles) to the gizmo and dragging by them.
 - Implemented “grow selection” and “shrink selection”.
 - Fixed that the falloff computation would always produce octagons.
 - Implemented recomputing falloff after drag was complete.
 - Lots of other bug fixes and speed improvements.
- V0.2.2 (Oct 11, 2019)
 - Implemented all the algorithms for computing falloff (smooth, sphere, square etc.)
 - First attempt at recomputing deltas when mouse wheel changes after mouse button was released but that’s still broken. Undo is also broken in that respect.
- V0.2.1 (Oct 8, 2019)
 - “Tool Settings” pane with options
 - Fixed selection: only change scene node if no scene node is previously selected. (Otherwise fixing meshes that are covered behind others becomes too hard, which defeats the tool’s purpose.)
 - Added curved falloff.

- Fixed undo, which was very broken.
- Fixed local axes when gizmo was in “local axes” mode, which were very broken if the node was not at the 0/0/0 position.
- More work at tool settings, which are not fully functional yet though.
- V0.1.0 Initial test version.