

# **Blacksmith3D Manual**

( Professional )

## **Version 8**

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# 1. Introduction

## About The Software

### Blacksmith3D

Designed for both professional artists and novices, Blacksmith3D provides artists with easy-to-use tools to achieve **precision**, **realistic** and **natural** effects, and to create **high quality art**.

3D artists who are using popular modeling, animation and rendering packages find it very **simple to integrate** with Blacksmith3D, and use it within their pipeline or as a stand-alone product to **enhance the quality** of their art in a **short period of time**. 2D artists, who are looking to experiment with 3D software, find Blacksmith3D very intuitive, as it has a standard 2D paint application look and feel.

Blacksmith3D now utilizes **64 bit technology** in Windows and OS X, increasing software performance and capabilities.

### Painting

Developed with the underlying philosophy of **just paint**, Blacksmith3D is fully loaded with features to ensure you've got **precision**, **power**, and **sophisticated drawing and detailing tools**, while you bring your extraordinary ideas to life.

Blacksmith3D application is used and appreciated by professional artists, and hobbyists alike. Once you try it, you'll find Blacksmith3D **very intuitive**, it looks and feels like a standard 2D paint application, yet it is true 3D.

### Morphing

Blacksmith3D's morphing functionality utilizes **Hot Selections** allowing you to deform objects in a very intuitive way. The hotter portions of the object deform the most and the cooler parts deform the least. In this way, you can easily create **smooth and continuous morphs**, with little effort.

Blacksmith3D also features a set of **Chisel** tools, which allows the artist to sculpt fine detail in their models. Optimized to work with existing model topology, these tools enable the artist to carve details where it was previously not possible with simple

brush strokes. For example, the **Contour Chisel** allows the artist to simply draw curves and the model's surface conforms to that shape. Carve new detail where you never thought possible. This whole new class of tools makes Blacksmith3D a powerful and intuitive morphing solution.

## Hair Creation and Editing

The **Hair** tab exposes tools which are specifically designed to be used for standard hair objects. Hair can be created from scratch using a **growth surface** geometry such as a skull cap, or it can be imported from a preexisting geometry file.

The **Hair Strand Creator** is a special tool which will add new geometry to the hair growth object ( skull cap ) in the form of a hair strand.

The other tools in this section are very similar to those found under the **Morph** tab, but with special modifications for dealing with hair geometry. For example, the **Strand Comb** tool is a combination of the **Picker** selection tool and the **Move Hammer**. The initial click will select the hair strand with a soft selection, and then the mouse motion will move the hair, in a soft fluid manner, just like real hair.

## Key Features

- **High resolution texture painting** - (utilizing 64 bit technology) System RAM and CPU power are the only limiting factors. In other words, it does not depend on your 3D video card capabilities.
- **Stacked Image Layers** - just like your favorite 2D paint application! Create any number of layers, change the blending modes and strengths for ultimate texture compositions.
- **Chisel Deformers** - sculpt your models on the fly using Blacksmith3D's powerful new chisel deformaters. Just like paint brushes, you can apply swift strokes in the viewport to bulge, smooth, flatten, sharpen and contour details that you never thought were possible. The **Contour Chisel** is especially powerful, as it allows you to simply draw curves on the surface, automatically pulling in the surrounding vertices, creating detail where it was previously not possible.
- **Real-time displacement/bump map** painting and rendering. Paint directly on the displacement and/or bump maps and see the result in real time. What you see is what you get, since there is **no need to bake** your maps. Every brush stroke is

immediately applied to the maps.

- **Auto-UV Mapping** – use the **Paint Setup Wizard** to auto-UV just about any object file with a single click. Ideally used with high resolution textures and with renderers that do not blur or rescale the textures to preserve the texture around the UV seams.
- **Presets** - Store tools, viewports and brush tiling as presets for rapid reuse during projects.
- **Custom Hotkeys** – simply right click on most interface elements to bind them to a hotkey on-the-fly ( CTRL-Click menu items to assign hotkeys for them )

## New In Version 7

### Hair Creation and Editing tools.

The **Hair** tab exposes tools for the creation and editing of hair objects for 3D characters. The hair is created and edited using an industry standard for 3D hair based on two main elements.

- A skull cap, or **growth surface**, which serves as a foundation for hair to grow out of.
- Flat, rectangular strands, which use a combination of transparency and color maps to give the illusion of many individual hairs.

A hair piece can be created from scratch, given the raw geometry used for the growth surface. Also, an existing hair piece can be edited as it is, or have additional strands added to it.

### Auto Pressure

For users that do not use a drawing tablet, and for creating special effects like small hairs on a surface, the **Auto Pressure** feature can vary the simulated pressure for each paint stroke. To create a hair effect, the **Auto Pressure Midpoint** may be set to a small value like 5%, to create a fatter base and a thinner tip.

### Stroke Smoothing

Stroke smoothing will automatically smooth out the path of the paint stroke to give a curvier effect. This will dramatically decrease “jitters” in the paint stroke that may be

due to painting with a mouse or other pointing device that does not offer the natural motion like a stylus.

## Optimized Painting Speed

Painting speed has been optimized for overall speed, and to reduce bottlenecks/lag when applying paint strokes to multiple high resolution textures.

## Templates

Export and import subsets of your project using Templates. Templates can be customized specifically for your workflow. Examples of what can be stored templates...

- **Complete character setups** – Apply your own custom default settings for any character simply by importing the template. May include default textures, morphs, display groups, presets, etc.
- **Image Map Layers** – Create a template that stores only certain layers that can be reused in other projects.
- **Morphs** – Create templates for common morphs that will be reused often.
- **Hair** – Create templates for starting your hair projects, including custom growth surfaces, hair textures, etc.
- Almost anything that exists in a Blacksmith3D project can be stored and reused in a template.

## Material Sets

Auto-assign image maps to all materials that share the same map for standard commercial characters ( e.g. Genesis characters by DAZ, Dusk/Dawn by Hivewire3D, etc. ). So if you assign a map to the material “Face”, you will be prompted to automatically assign the same map to all other materials in that set like “Lips”, “Nostrils” .

## Fixed Assets – Content Management

Assets imported from your content libraries can now be stored as **Fixed Assets** in Blacksmith3D. This means that instead of saving and loading the data in every

Blacksmith3D project and/or template file, they can be reloaded from their original file location instead. This makes project and template files much smaller, and faster to save. Examples of items that are good candidates for fixed assets are...

- Geometry files such as standard characters. ( e.g. Genesis characters from DAZ )
- Texture maps that are used for display, but not being edited.

Fixed assets are especially useful when creating templates, since the template can be redistributed to other users without transferring items that may be protected by copyright, etc. The end user will need to have those fixed assets installed in their content folders.

### **Photoshop™ ABR Import Support**

Import ABR files to use as brush tips. Please note the following requirements.

- ABR version must be 6.1 or 6.2
- Only bitmap based brushes are supported
- Not all attributes of the brush are preserved due to compatibility reasons.

### **Texture Transformer Packs**

Texture Transformer packs are now distributed as single files, instead of a folder containing multiple files. This makes managing your collection much easier, and reduced confusion when updating/replacing packages.



## 2. Quick Start

This section of the manual has been designed to walk you through the basic workflow of importing data into Blacksmith3D, editing it as you wish and exporting the relevant data to your rendering solution.

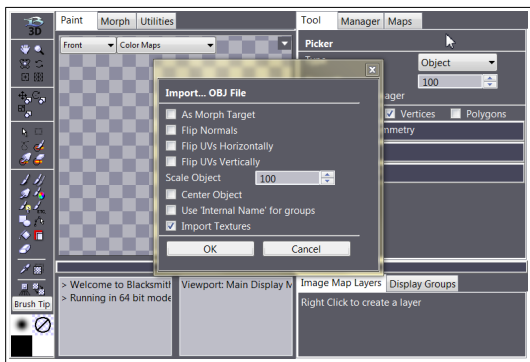
For Blacksmith3D, the basic workflow goes something like this...

- Import the model and any existing textures into Blacksmith3D.
- If Auto-UV mapping is desired, execute the Paint Setup Wizard
- Paint the model as desired, importing **Brush Images** and photo references as desired.
- If Auto-UV mapping was utilized, export the object with its new UV mapping and the newly created texture maps. Otherwise, just export the texture maps, since nothing in the object has been changed.

### Simple object with one UV mapping region

Let us start with the situation where you are utilizing the existing UV mapping of the object. Let us assume that the model has a single UV region, so one map wraps around the whole object **without overlapping in UV space**.

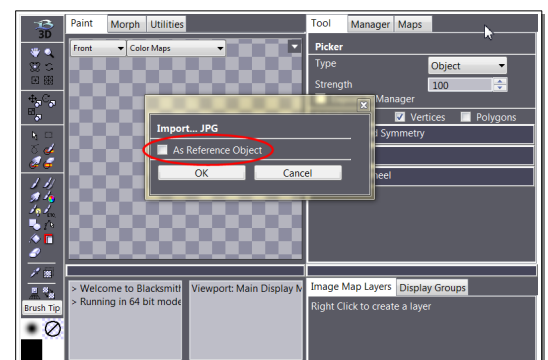
#### Step 1. Importing the object



You can import the object in one of two ways. You can simply drag and drop the object file into a viewport, or you choose the **File-Import...** menu option. You will be presented with a few options, but unless you have a good reason to change them, simply use the default settings.

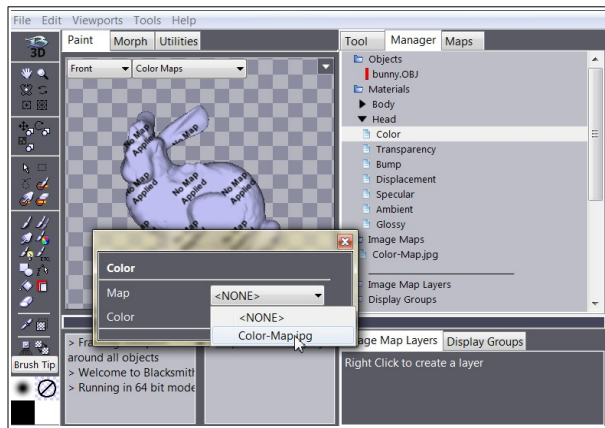
#### Step 2. Importing or Creating a Texture Map

If the object file contains references to existing texture maps, then Blacksmith3D will attempt to locate and automatically load them. When this is not the case, then you will have to either manually import and apply existing textures, or create them from scratch.



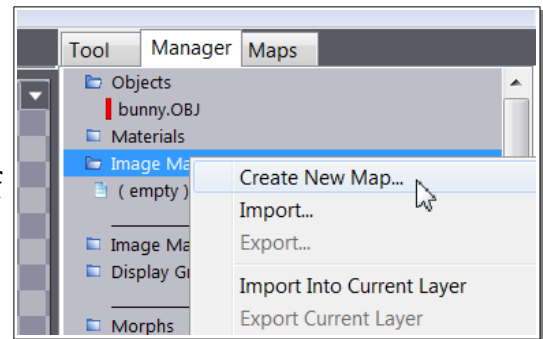
First, let's demonstrate how to manually import a texture map.

The easiest way of doing this is to simply drag and drop the image files into the main window, make sure that **As Reference Object** is NOT checked and then click OK. Alternatively, you can choose **File-Import** from the menu and locate the desired file.



To apply the image map to one or more materials for an object, highlight the material channel(s) in the **Manager** ( see **Materials** ) and choose the map from the drop-down menu. Notice how we can assign multiple channels at the same time via multi-highlighting, but be careful to assign them properly. You may accidentally highlight another type of channel (e.g. Transparency) and assign it a color map, which may lead to confusion.

To **create** a new texture map from scratch, right click on the **Image Maps** entry of the **Manager** and then click on **Create New Map**. You will then be prompted to input the name and dimensions of the newly created map. Also note, that the file extension is required as a part of the name, so Blacksmith3D knows what format to save it as when exporting (e.g. NewMap.PNG). This file extension can be changed at any time by simply **renaming** the map. Also, please note that even though the default size of the texture is 2048x2048, **you are NOT limited to textures whose dimensions are powers of 2** (256, 512, 1024, 2048, etc.). To apply the newly created texture to the object, simply drag and drop it into the viewport as previously described.

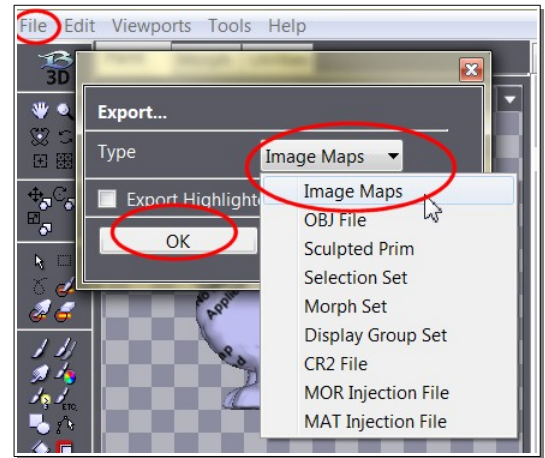


### Step 3. Paint on the textures

There are an infinite number of possibilities here, many of which are the subject of other tutorials. Use any of the paint brushes to create whatever textures that you desire. Some of these techniques are demonstrated in video tutorials, which are available for viewing on our website.

## Step 4. Exporting the Texture

Since the UV mapping of the model remains unchanged, the only thing that you need to export from Blacksmith3D is the texture map. To do this, choose **File-Export** from the menu, and then choose **Image Maps** from the **Types** drop-down. You will then be prompted for the file name and location of the resulting file(s) and the file will be saved. Please note, that if you change the file name, then the name of the map will be changed within Blacksmith3D as well to help keep things in sync.

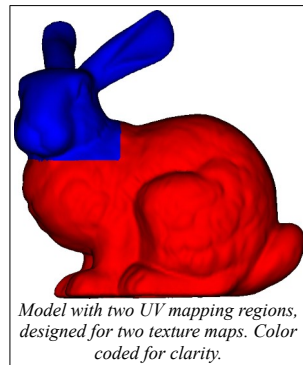


**WARNING** – If you export an OBJ first, then export the texture map(s) with a different file name, then the OBJ file ( via the MTL file) will still refer to the old file name. To avoid this problem, **export the maps first**, and then the OBJ.

## Simple object with multiple UV mapping regions

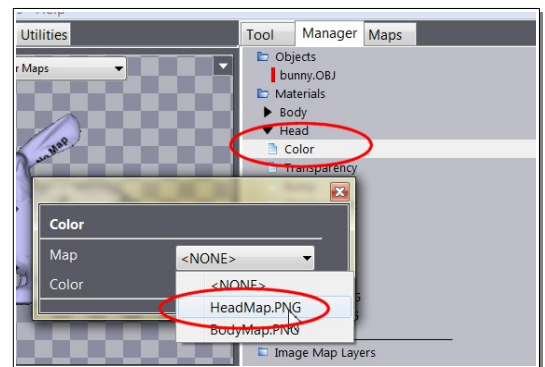
Now we consider the familiar case where a model has been designed to have at least two different UV mapping regions. For character development, this is often used to make separate head and body maps.

**Step 1.** Import the object file as previously discussed in **Section .**



**Step 2.** Create or import two texture maps following the same procedure as discussed in **Section .**

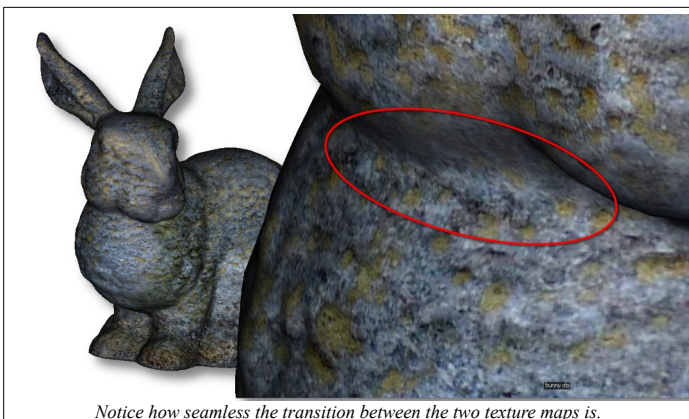
**Step 3.** Apply the texture maps to the appropriate material channels. In this case, it is quite simple. We have a texture called headMap.PNG we are assigning it to the material **Head**. Likewise, we have another texture called bodyMap.PNG and we are assigning it to the material **Body**.



Now that the two maps are applied to the model, you can seamlessly paint across both of them as if they were the same map.

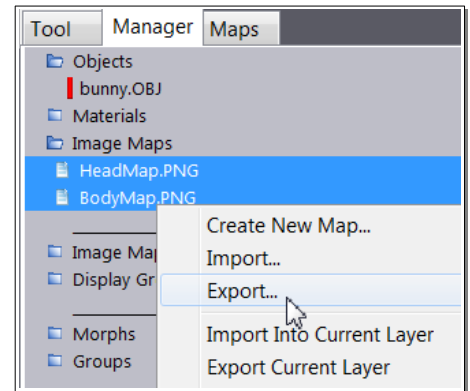
**Blacksmith3D will paint across the map boundary as easily as it paints across UV seams.**

**Step 4.** When you have finished painting the models, then simply export each one in the same way as you did in **Section .**



## Exporting Textures

You can export image maps by right clicking on each one in the Manager, and then choosing **Export**. You can also multi-select and export multiple textures at the same time. Other methods of exporting textures will be discussed in later tutorials.



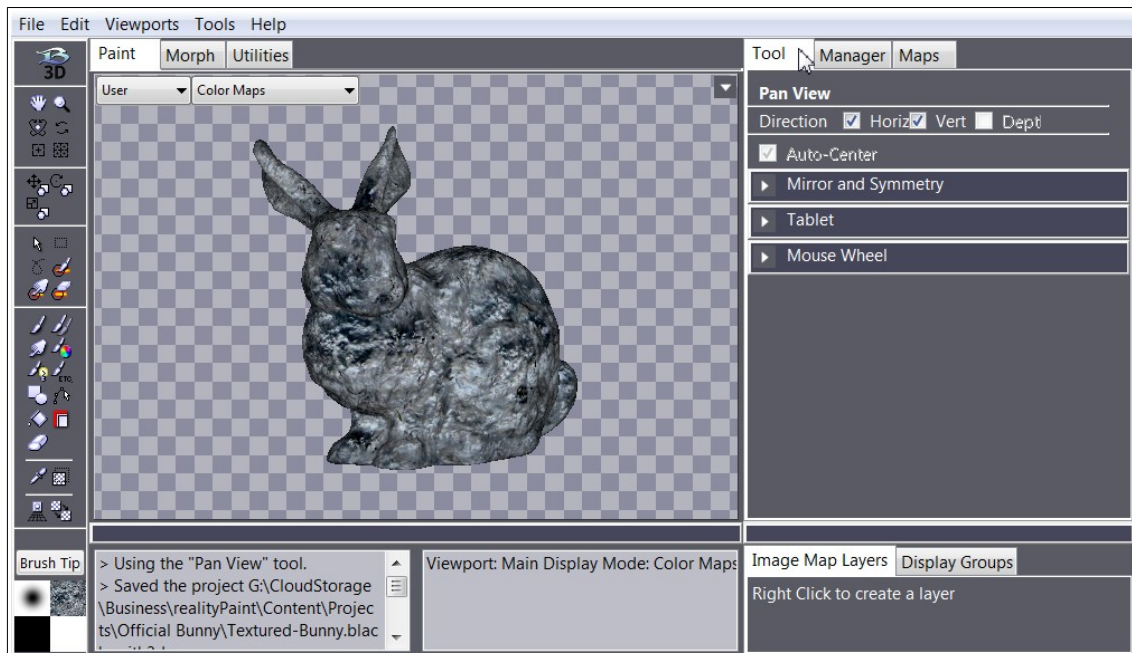
## Commentary

This section was meant to give you a quick look at the import/export process of Blacksmith3D, but was not meant as a complete tutorial. The Tutorials section gives you step by step instructions on how to use the basic and advanced features of Blacksmith3D.



### 3. Interface Design and Workflow

You may have noticed that although the software is a true 3D application, it **feels like a 2D painting application**. This is by design for the following reason; Just about every 3D application on the market has a dramatically **different interface**, and knowing your way around one of them doesn't help you much with the next. So we modeled the software's interface after something every graphic artist is familiar with; the **2D Painting Application**. Also, as a cross platform application, and one that is **drawing tablet friendly**. As such, we have minimized the dependence on middle and right click buttons. The middle button can be used as an alternative to using the F1-F3 hotkeys for navigating, and the right mouse button is only used for popup menus. All of the tools in Blacksmith3D operate using a left click, with options that include holding the ALT or SHIFT keys.



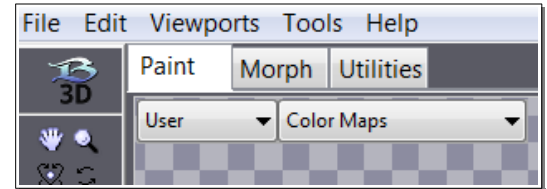
#### Important Note about Navigation Hotkeys

Blacksmith3D's default navigation method is optimized for users using a drawing tablet or stylus. If you prefer a traditional mouse/modifier key method, we have also implemented the **“Blender” standard for middle mouse button navigation**. Please see the **Basic Navigation** tutorial for more details.

Use the use the F1, F2, and F3 hotkeys while clicking and dragging to Pan, Zoom or Rotate.  
Press the key again to toggle back to previous tool.

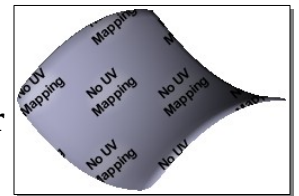
## Interface Layout

Since Blacksmith3D has several sub-programs within it (Paint, Morph, Utilities), we logically separated them into **tabbed sections**. Rather than clogging up the left hand toolbar with every tool in the software, only the ones that are relevant to the current section are visible.



Every section contains the Navigation, Transformation and Selection tools since they are used universally across the full suite. When the **Morph** tab is active, the deformer tools appear below the selection tools ( which are always shown. When the **Paint** tab is active, the painting tools appear directly below the selection tool in the same way. Finally, when the **Utility** tab is active, the utility tools appear there.

Depending on which **Display Mode** you are using, you may see messages written across the model. For example, when no UV mapping exists on a model, then the words **No UV Mapping** appear tiled across the model. This may seem like a bit of overkill, but you would be surprised how many people emailed us about the painting features not working properly, when the model had no UV mapping setup.



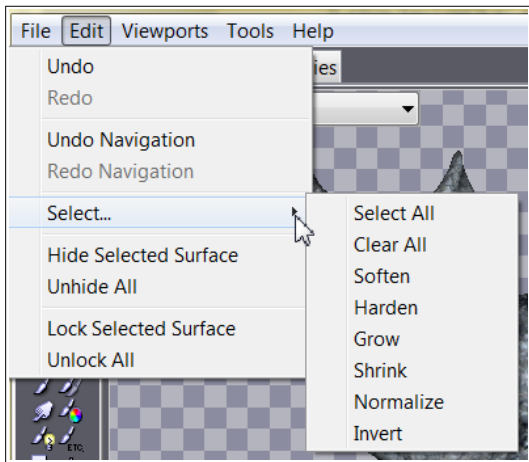
When no UV mapping exists on a model, the words **No UV Mapping** appear tiled across the model. To proceed, simply apply your existing UV Map, or Auto UV Map with the Paint Setup Wizard tool.

Likewise, if there is a UV mapping, but no texture map applied to the current channel (color, bump, displacement, etc.) then the words **No Map Applied** will appear across the surface, since you cannot paint if there is not a map to paint on. These may seem like trivial things, but they can save you time and frustration wondering “why can't I paint on this object?”. Even the best of us get stumped on such oversights, so the more **feedback** the software gives you, the more productive you will be.



## Menu

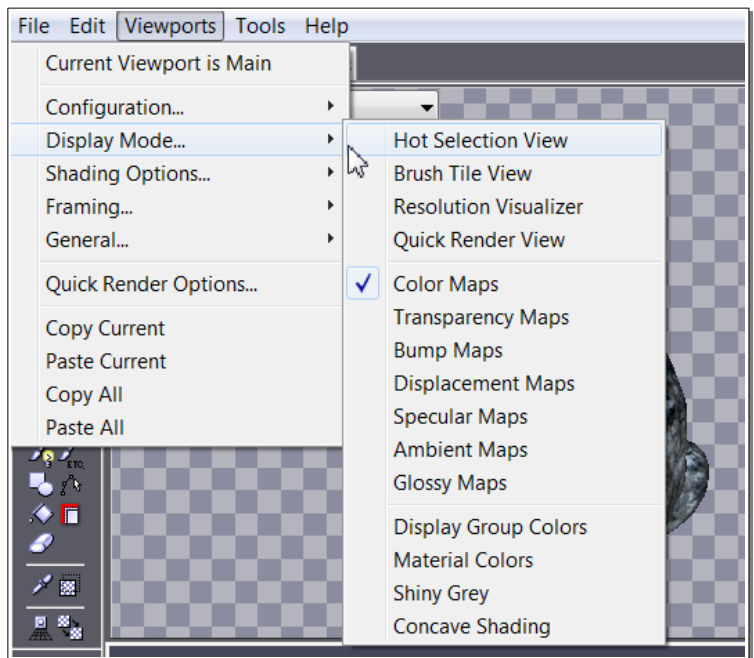
The menu has been laid out to be consistent with just about any application that you may have used. The **File** menu is where you would expect to find features such as **Open/Save Project**, **Import/Export**, etc.



The **Edit** menu contains features such as **Undo/Redo**, **Hide/Unhide** and **Lock/Unlock** and a sub-menu for modifying the current selection. For more info, see **File menu** in the reference section.

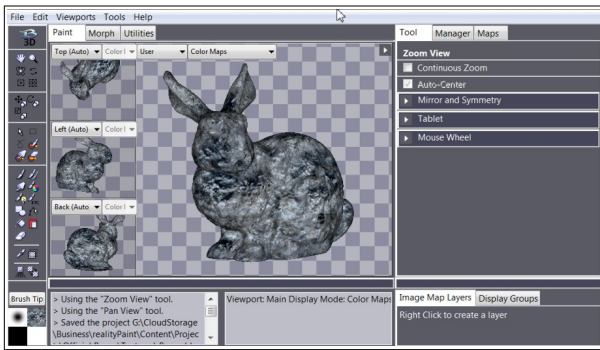
In the **Viewports** menu, you will find many options for manipulating the current viewport, and for multi-viewport configurations. The most significant sub-menu in there is **Display Mode**. This allows you to change how and what is being displayed in the current viewport. By default, the objects in the viewport are rendered with their **Color** (or diffuse) maps. However, you can change that to any of the supported map channel types, like **Bump**, **Displacement**, etc.

Also very noteworthy are the **Special Display Modes** that are listed at the top of the menu. Those are **Hot Selection View**, **Brush Tile View** and **Quick Render View**. These display modes have been designed to be quickly toggled on and off with their respective hotkeys (SHIFT-SPACE, V and R) ( see **Display Mode** )



**Special Display Modes** can be toggled on and off with their respective hotkeys - Shift-Space, Shift-V, and Shift-R. These allow for Hot Selection, Brush Tile, and Quick Render Views.

## Viewports



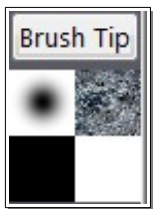
The default configuration is four viewports. By pressing the **CTRL-Space** bar hotkey, you can maximize or restore the current viewport. Also, the default configuration is such that you have one large viewport, and three smaller **Auto** viewports, **Left**, **Right** and **Top**.

So what is this **Auto** that was mentioned? Well, it's a novel idea really. What it means is that **Left (Auto)** is actually left, relative to the current viewport orientation. It's a 90 degree rotation to the left side. Likewise, **Auto (Top)** is like the top view as if the current viewing angle in the main viewport was set to **Front**.

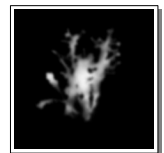
Why, you may ask? Well, this way, you can always keep an eye on what is happening on the side, on the top, and on the back, regardless of the current viewing angle. There are of course many other viewport configurations that you can customize via the **Viewports** menu, and the **Orientation** box at the top-left corner of each viewport.

Use **Auto** viewport to view objects relative to the current viewport orientation.  
Press the **Space** bar to maximize or restore the current viewport.

## Brush Shape, Image and Color Boxes



These three boxes are absolutely essential for painting textures in Blacksmith3D. The first box is the **Brush Shape** box, which as you may have guessed, defines the shape of each impression of the brush stroke. By clicking on it, you can choose from a library of predefined shapes. You can also **drag and drop an image file** onto this box to create a custom shape, based on the relative lightness of the image. Although in the interface, the shape is drawn black on white, the source image should actually be the opposite. So **black means fully transparent** and **white means fully opaque**.



The second box is the **Brush Image** box, and is the source of ultimate power in Blacksmith3D. You can simply drag and drop your textures directly into this box, and each brush stroke will contain all of the complex detail of your well chosen texture

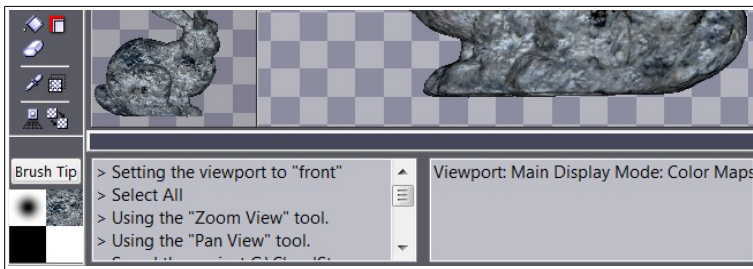
sources. Although they do not have to be, **tileable textures** perform especially well for creating seamless details that can be wrapped in a variety of ways. By clicking on this box, you will get access to the preset textures that ship with the software, as well as options that control how the textures are utilized (to be discussed later in this manual).

Finally, we have the familiar color boxes, which define the primary and secondary colors. The color box on the top right corner represents the **Primary Color** while the one to the bottom right represents the **Secondary Color**.

For more information, please see **Brush Tip Window and Mini Panel**.

Create a custom shaped brush by dragging and dropping an image into the **Brush Shape** box.

## Message Window

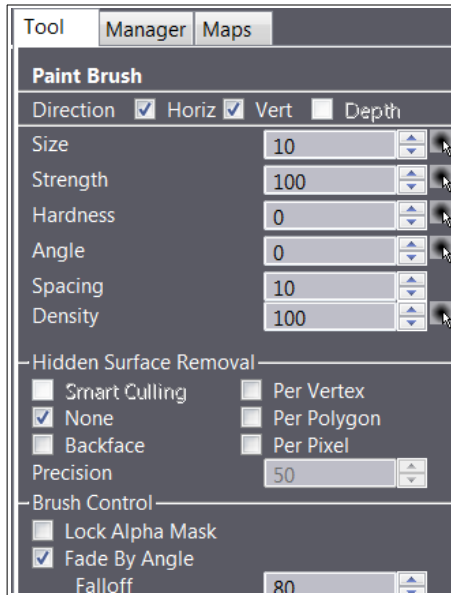


The message window at the bottom is split into two panes. The left pane displays feedback messages as you work in Blacksmith3D. It will often print flashing warning messages designed to help guide you past as

**many common pitfalls** as we could think of. If you try to deform a morph target without choosing one first, it will tell you. If you try painting on an area of the model that has no map applied to it, it will tell you. You get the idea.

The pane to the right provides **immediate feedback** based on the current action being taken. When you simply hover the mouse over the model, it will give you information such as the object name, the polygon index being pointed at, etc. Some tools will print specific information in this box relating to their individual functionality.

## Tool Settings



The Tool Setting section contains the parameters that control how the current tool behaves. Many of the tools have common parameters, and some are specific and unique. For example, most brush-style tools have parameters such as **Size**, **Strength**, **Hardness**, etc. Most tools that involve any kind of mouse motion in the viewport also have **Direction** controls.

For more information, please see the Tool Tab in.

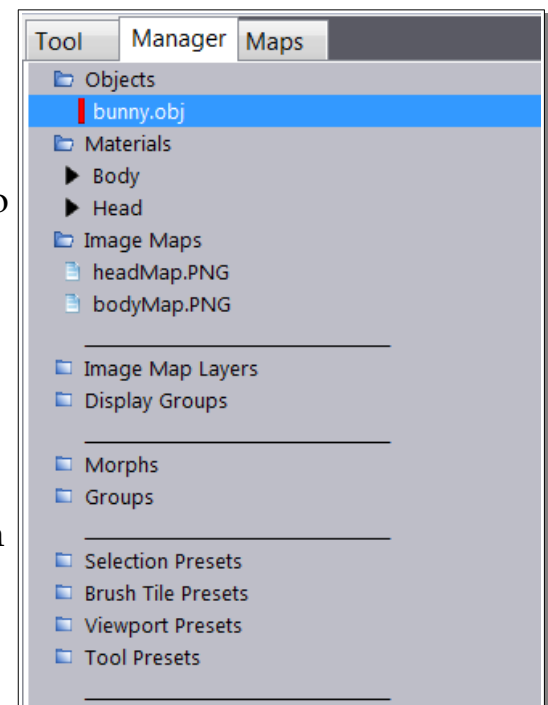
## Manager

This section allows you to manage the macroscopic elements in your scene like **Objects**, **Image Maps**, **Morphs**, **Materials**, etc. In other words, *all of your stuff*. There are three main things to note here;

First, is that the file folder icons indicate a group that can be expanded to reveal one or more items within it. Click the folder icon to expand it and click it again to collapse it.

Second, are the little buttons with a triangle icon in front of the some items (e.g. Materials); This button expands or collapses the item to reveal sub-items. In the case of Materials, expanding it reveals the individual material channels like Color, Bump, Transparency, etc. Once clicked on, an item's properties are revealed in the right-most menu panel.

Third, are the red boxes seen in front of some items. Those boxes indicates that the item is the **current** item, which may be relevant for certain operations. For example, when deforming, then only the **current morph target** will be deformed. Most (if not all) tools

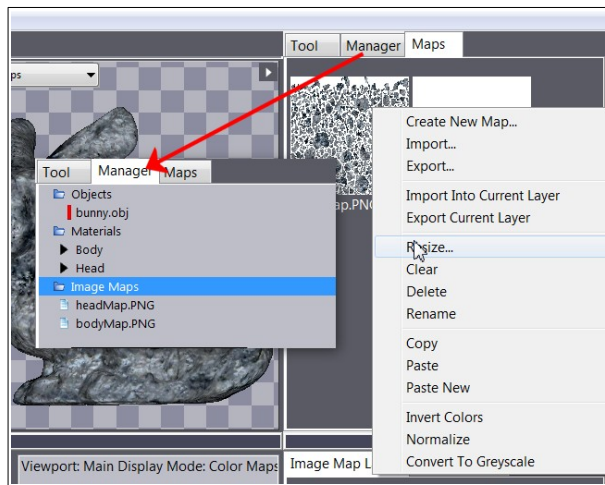


do not only act on the **current object**. They can act on any object in the scene. A paint stroke can paint across multiple objects as if they were the same. If you do have multiple objects in the scene, and only wish to paint on one of them, you can **lock** or **hide** the ones that you do not wish to affect (see bottom of **Edit** menu), or simply select the one you **DO** want to affect before painting (if a selection is present, the paint will only affect what is selected, just like your favorite 2D painting applications).

As a side note, when an item has been selected in the manager, we will refer to it as being **highlighted**, rather than **selected**. We do this to avoid confusion with **vertex/polygon hot selections** in the viewport.

Paint across **multiple objects** as if they were the same with a single paint stroke. Lock or hide objects you don't want to affect. **Reference Objects** are not affected by paint strokes.

## Image Maps



The maps section of the manager is where you find all of the Image Maps in the project. The maps can be highlighted individually, by clicking on them, and can be multi-highlighted in the **Manager** ( e.g hold **SHIFT** ) as well. There is also a separate **Maps** tab so you can see the thumbnails. You can also right click on the icons and get the same options that are present in the manager. The main difference is that you can multi-highlight items in the Manager.

Unlike many other applications, Blacksmith3D will save the maps directly in the project file. This is to avoid the problems with maps being moved, deleted, overwritten, etc. Once you import a map, it lives in your project file until exported, so you won't lose valuable production time tracking down missing textures.

## 4. Common Pitfalls

This section tries to anticipate possible sticking points that you may encounter, and offer solutions to save you countless hours of frustrating trial and error.

Painting textures for 3D models can be an extremely frustrating experience when someone who is new to or doesn't fully understand the technical underpinning of the process. It is this software's intention to make that process as painless as possible, at the same time, it has to work in such a way that its output is **compatible with industry standard renderers**.

### UV Mapping

is probably the biggest sticking point, cause of frustration, and essentially the root of all evil pertaining to creating textures for 3D models. As we discussed previously in this manual, the relationship between UV seams and stretching is a mathematical certainty when unwrapping 3D models into 2D planes. In any case, here are some of the most common pitfalls regarding UV mapping and Blacksmith3D.

### No UV Mapping

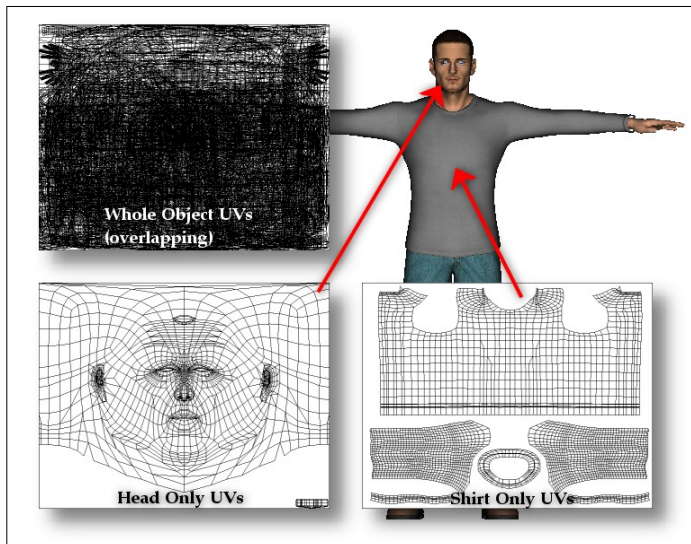
Sounds like a no brainer, doesn't it. But often users try to paint on models with no UV mapping. If you see the words “No UV Map” written across the object, then either use the **Paint Setup Wizard** to create an Auto-UV map, or UV map it first in your favorite UV mapping application.



## Overlapping UV Mapping

This problem occurs most commonly given the following scenarios;

### Multiple UV regions in the model



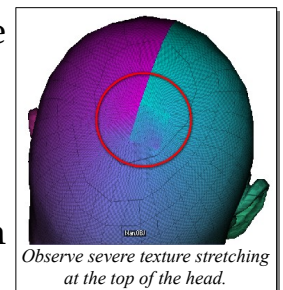
When a model is designed for multiple texture maps, the creator may use one texture map for the head, and a different one for the body. In that case, the UV mapping for the head overlaps with the UV mapping for the body. This is not a problem when the materials are setup with their proper texture maps (all head materials are assigned the head map, likewise for the body), but if you assign the same texture map to all of the materials, it will not paint properly.

Blacksmith3D will display warning message when you hover over polygons that overlap in UV space, and the hint window at the bottom will warn you of this, so pay attention to the warnings.

### Excessively Stretched UVs

are common, because the traditional mentality is still to minimize the UV seam count, so the textures can easily be painted in a 2D paint application. However, a natural side effect of this is texture stretching, which can make parts of the texture look warped and blurry, leaving you with few options. Some try to hide that area from sight, blur the heck out of it, or touch it up in post production.

Blacksmith3D will do its best painting across these areas, but please be aware of this, and consider re-UV mapping (manually or auto-UV map), and be a bit more generous with the seams. Remember, you can STILL utilize your 2D painting applications via the **Projection Brush** tool, allowing you to paint across seams as easily as you can natively in Blacksmith3D.





## Painting

Here are a few common problems and solutions directly associated with painting textures in 3D.

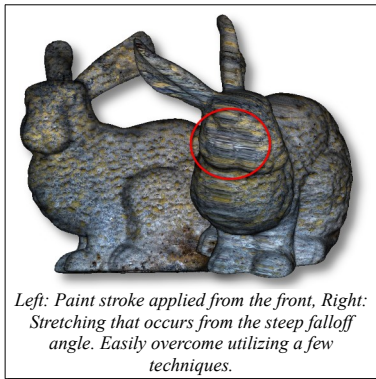
### Texture Seams and Low Resolution Maps

are a horrible combination. Blacksmith3D can paint across UV seams extremely well. However when the resolution is too low, or you zoom in too close to the point where the pixelization becomes apparent, then the difference in the alignment of the pixels on either side of the seam become visible. There is no way around this given the existing UV mapping/texturing standards.



This problem is not associated with any particular 3d application. If it uses UV mapping and 2D texture maps, then these sort of artifacts will always arise. It may only become apparent when the relationship between the texture resolution and the number of UV seams becomes out of balance.

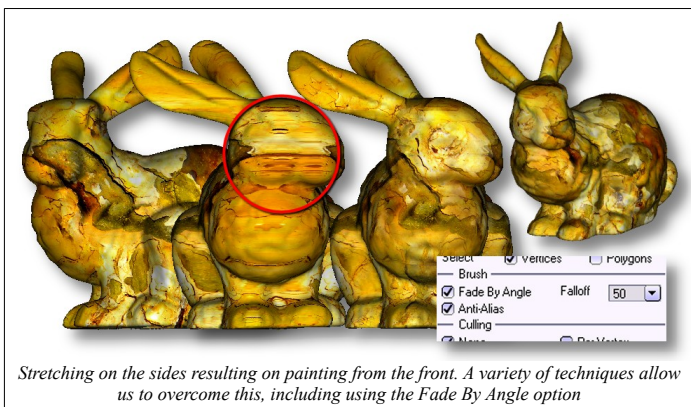
With that being said, auto-UV mapping is not appropriate for low resolution work. Use a high resolution map and forget about it, or use a low resolution map and manually UV map the object and hide the seams wherever possible.



## Paint stretching across the sides

is absolutely NOT the same thing as UV stretching. Since each paint stroke is occurring in 2D, and being projected onto the model in the plane of the viewport, a common problem is that the paint map appear stretched across the sides of the model, that are at a steep angle relative to the viewport. This problem is easily overcome with a few techniques;

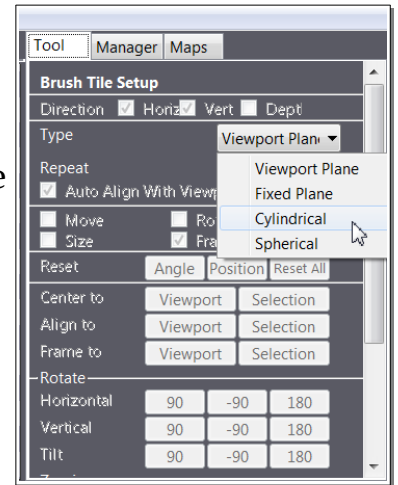
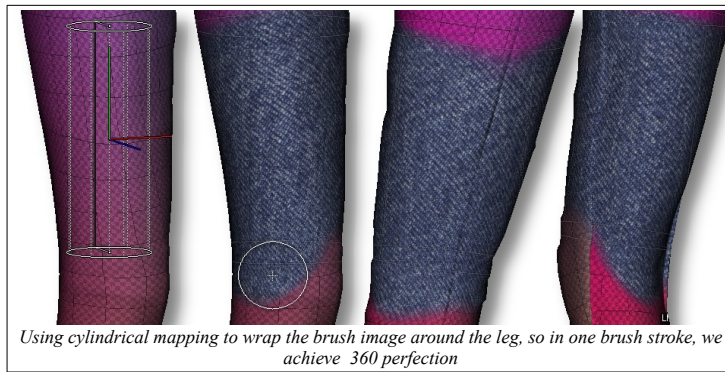
### *Fade By Angle*



Using the **Fade By Angle** option, the paint is thinned as the angle between the viewport plane increases. The general procedure goes something like this; Paint your texture from the front without **Fade By Angle** checked, allowing the sides to become stretched. Then paint from the sides (left, right, top, bottom) **with Fade By Angle checked**, and the you will paint over the stretched portions without creating additional stretching on the front again.

## Brush Tile Setup

When using a **Brush Image**, the default behavior is to map the brush image to the plane of the viewport. However, you can press the **SHIFT-V** hotkey to activate the **Brush Tile Setup**, which is also available by clicking on the brush image box at the lower left corner, then clicking on the **Setup** button. For example, you can setup a **Cylindrical** mapping around a character's pant leg, and then paint it using a tileable texture, and it will **wrap around perfectly without texture stretching**.

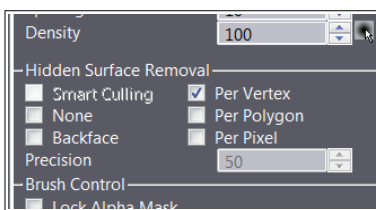


## Simply be careful around steep falloff areas

When doing precision work rather than simply painting broadly, make sure that surface that you are painting on is facing the viewport. Hit the **F3** hotkey to toggle on the **Rotate View** tool, then click and drag to rotate the surface so it's relatively flush with the viewport.

To prevent texture stretching across sides, use the **Fade by Angle** option, or wrap the brush image strategically using the **Brush Tile Setup** tool.

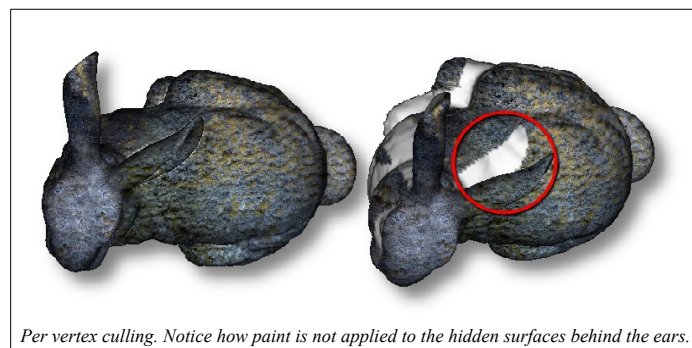
## Hidden Surface Removal



The Hidden Surface Removal options in the tool window provide you with several methods of dealing with hidden surfaces. **Per Vertex** means that if a vertex is hidden behind another portion of the surface, it will be considered culled. Some polygons will have one or more vertices that are culled,

while others that are visible, result in the paint being **faded** across the polygon. **Per Polygon** culling is almost the same as **Per Vertex**, however, it is less forgiving. If any vertex in the polygon is culled, then the whole polygon is considered to be culled.

When painting on low polygon models, per vertex culling may not always yield desirable results, since the polygons are quite large, and culling one vertex on it may affect you ability to paint on a huge portion of the surface. In this case, it may be useful to subdivide the object first ( in the **Utility Tools** section ). There are other ways of limiting where the paint can be applied, such as creating a selection (so the paint only goes on the selected area), or by **hiding** portions of the surface, so they will not be affected. Depending on the resolution of the model (vertices and polygons), some bleeding may occur when using **Per Vertex** hidden surface removal For more information, please read the **Commentary** section for the **Retouch Brush**.



*Per vertex culling. Notice how paint is not applied to the hidden surfaces behind the ears.*

## ***5. Tutorials***

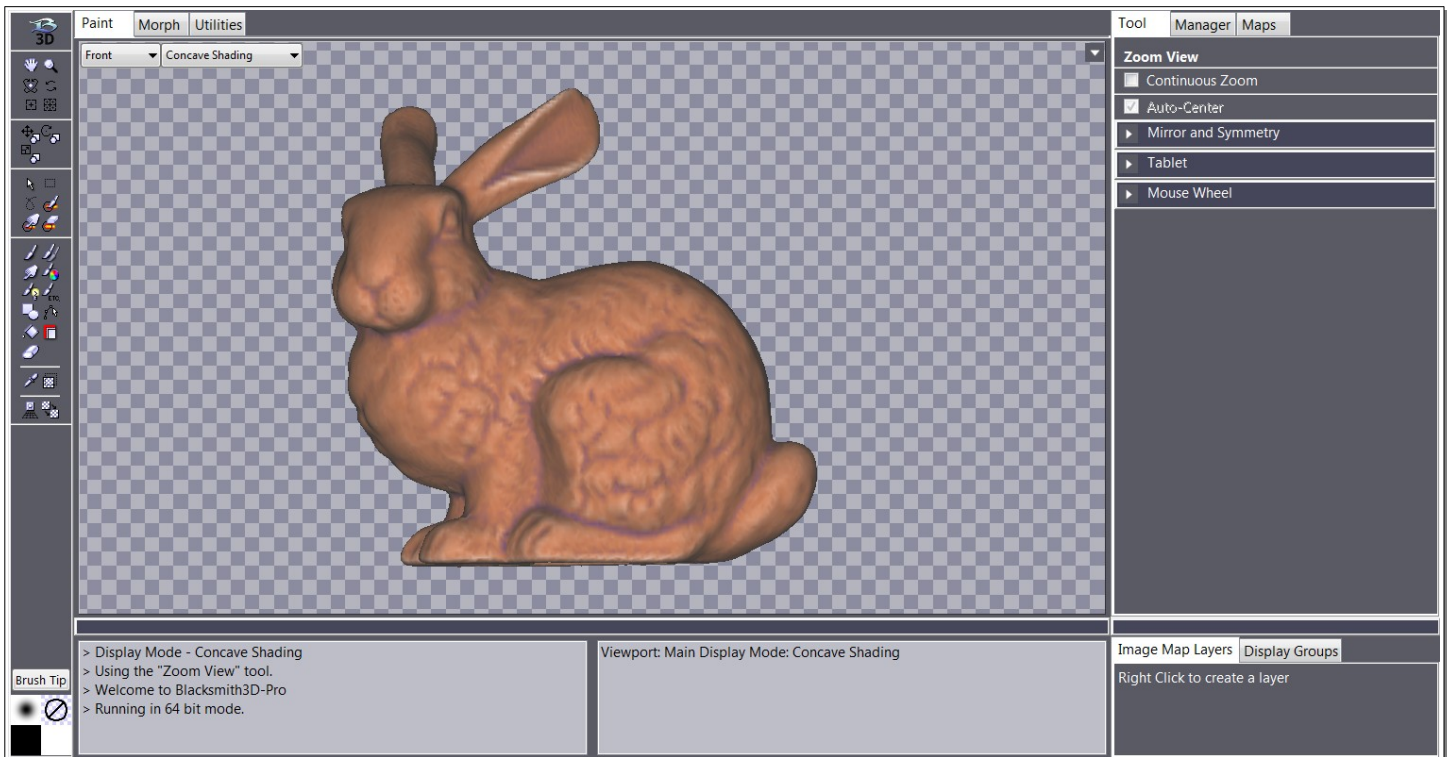
In this section, we will guide you through the most common uses for Blacksmith3D. The first batch of tutorials may seem simple and obvious, but we do recommend that you go through them anyway, as they will teach you the basics of the Blacksmith3D workflow, which involves 3D navigation, selection tools, asset management, etc.

## 3D Navigation

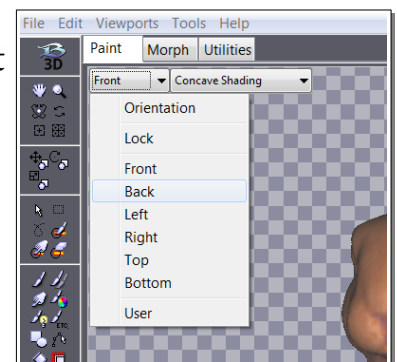
If you have been using 3D graphics software for a while, you would have noticed a lack of consistency between the different packages regarding the setup of the 3D space and how to navigate around it. For more information, please see the section Important Note about Navigation Hotkeys for more information. So, with that being said, let us show you how to navigate the 3D space inside Blacksmith3D.

### Basic Navigation

First, load in the 3D object of choice. Here we use the Stanford bunny




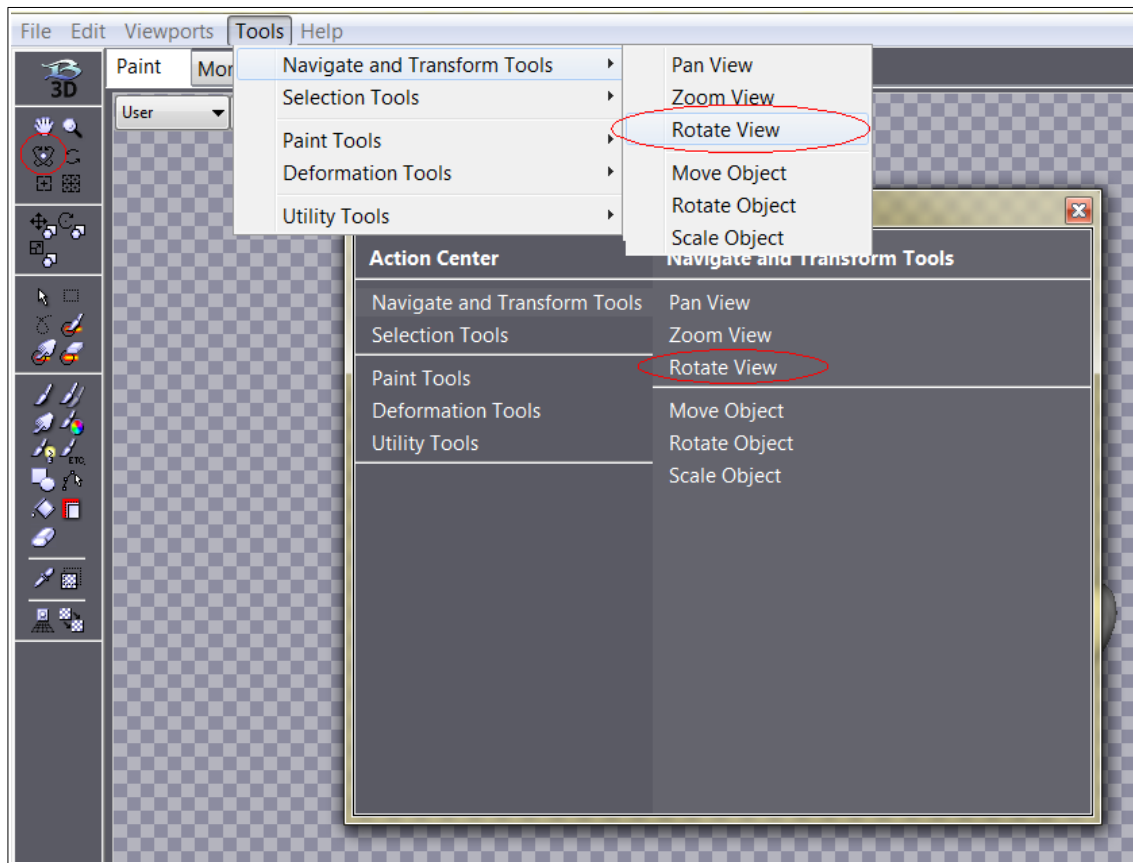
The default viewing angle is set to **Front** as seen at the top-left corner of the viewport. To change to other standard viewing angles, you can choose Front, Back, Left, Right, Top and Bottom from the drop-down list.





To rotate the viewport to an arbitrary angle, choose the **Rotate View** tool which can be accessed in number of ways...

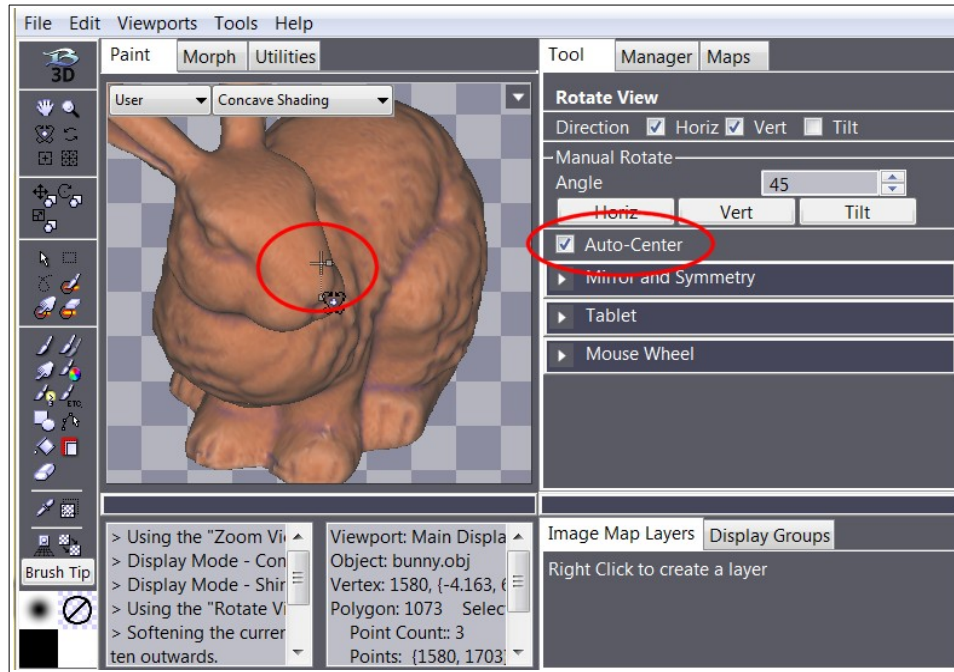
- The Rotate View icon in the left panel 
- From the main menu under Tools->Navigation and Transform Tools->Rotate View"
- Pressing the **F3 hotkey** to toggle between the current tool and the Rotate View tool
- Using the **middle mouse button** and clicking and dragging in the viewport.
- Using the Menu Overlay which is toggled via the SPACE bar hotkey.



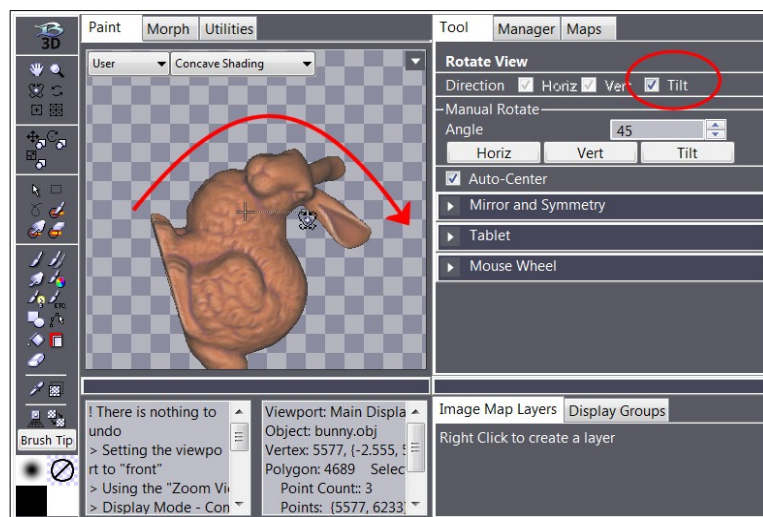
We recommended that you use the F3 hotkey as it allows for rapid toggling between the navigation tool and the other tools you may be using ( e.g. paint brush ).



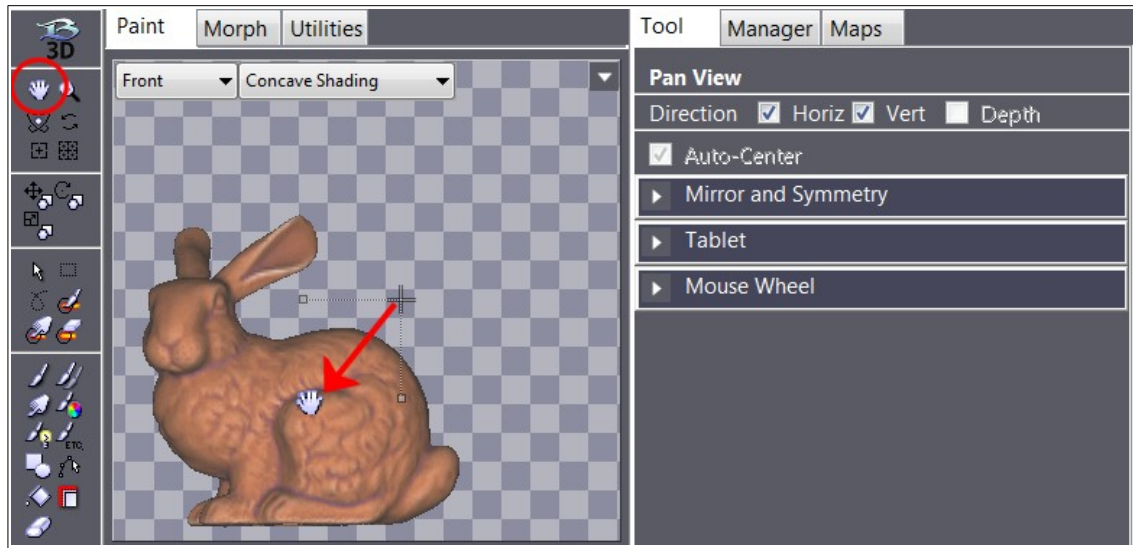
Now that the Rotate View tool is active, click on a distinctive feature of the model and drag the mouse. Notice how the part of the surface you clicked on drifts to the center of the viewport? This is a feature that is unique to Blacksmith3D and it can be turned on or off via the **Auto-Center** option.



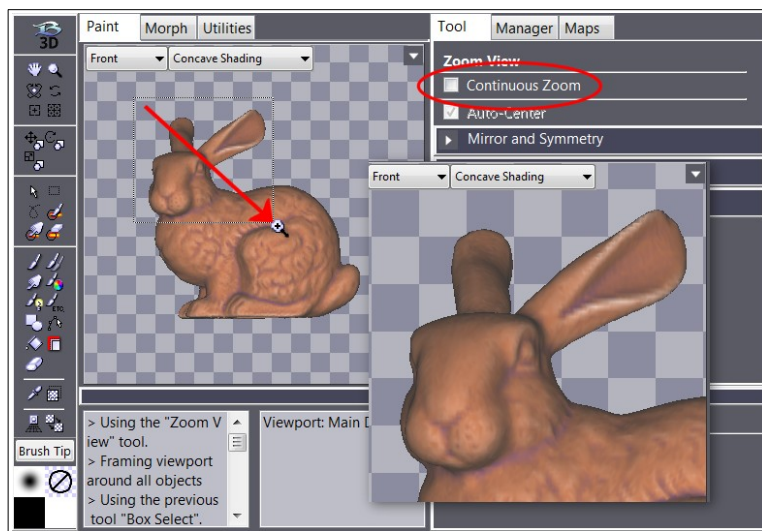
You can restrict the direction of rotation in the Horizontal, Vertical and Tilt directions. These directions are relative to the current viewport angle, and not absolute angles, so they are much easier to deal with. Note that **Tilt** can only be used exclusively while **Horiz** and **Vert** can be combined with each other.



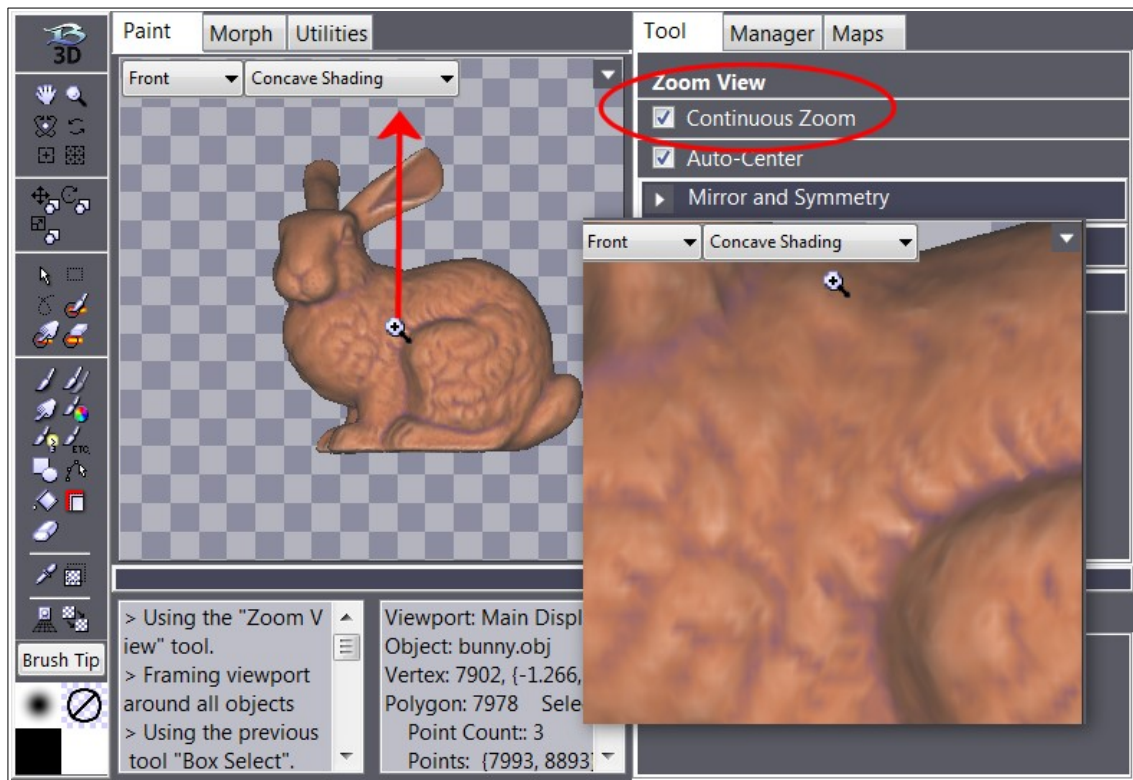
Likewise, you can use the **Pan View** tool, which can be accessed with the **F1 hotkey**, or in the other locations mentioned above. You may also use **SHIFT-Middle Mouse Button** to quickly move the viewport.



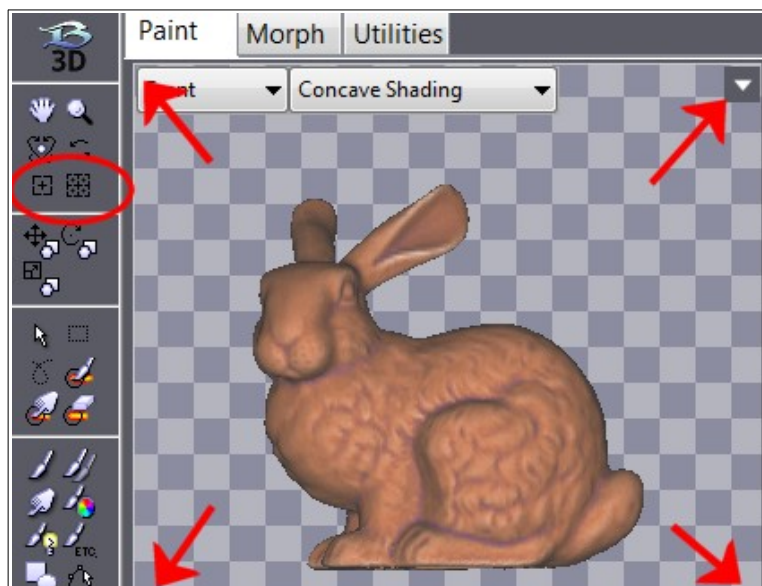
Next, we'll take a look at the **Zoom View** tool. This tool was designed to work just like the zoom tool of your favorite 2D painting application. However, some users prefer how a traditional 3D zoom tool works, so we have options for both. First, let's look at the 2D painting style zoom. When we press the **F2 hotkey** to activate the **Zoom View** tool, we'll notice the **Continuous Zoom** option in the tool panel. Leave that unchecked for now. Click and drag a box around the area that you would like to zoom into, and then release the mouse button. The viewport will then be framed around that area you selected.



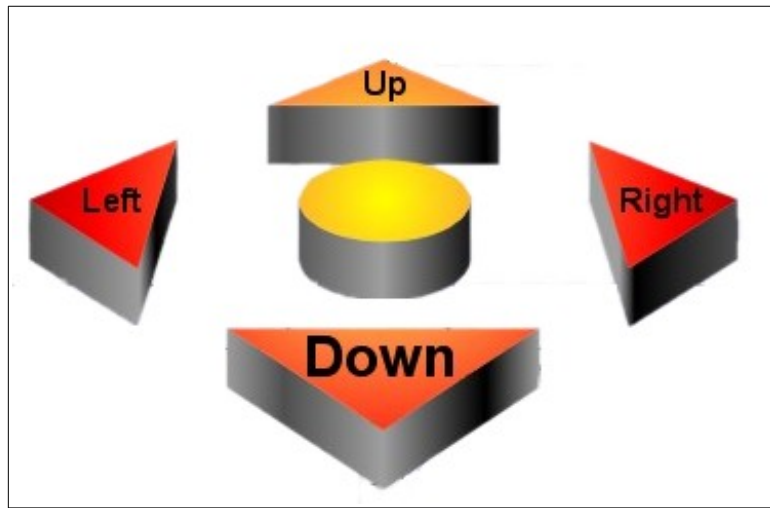
Now, uncheck **Continuous Zoom**, click on the model, and drag the mouse. Like the **Rotate View** tool, you'll notice that the point you clicked on will drift to the center of the viewport. If you do not like that behavior, you can simply uncheck the **Auto-Center** option.



To reset, or frame the viewport(s), you can use the Frame Viewports options, which are available as icons in the left tool bar, or in the menu under **Viewports-Framing...**



Revisiting the preset angles, **Front**, **Back**, etc., you can quickly switch between them using the arrow keys on your keyboard where the up arrow is **Back**, the down arrow is **Front**, the left arrow is **Left** and the right arrow is **Right**. It may seem odd at first that the up arrow is **Back** and not **Front**, but if you look at your keyboard, chances are, the up arrow is facing toward the screen, into the viewport and hence in the **back** direction. The down key is pointing outward, hence in the **front** direction. Similarly, **SHIFT-UP** sets the viewport angle to **Bottom**, and **SHIFT-DOWN** sets it to **Top**.



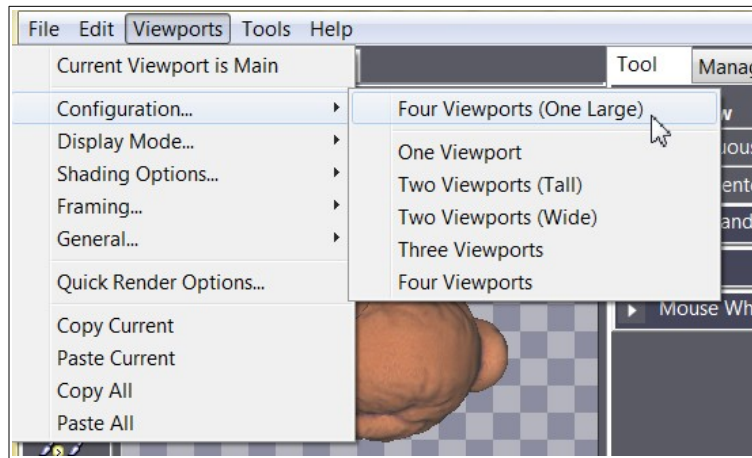
You now have all the information you need for basic 3D navigation in the Blacksmith3D viewports. Other tutorials will show you more advanced topics, like creating **Viewport Presets**, which allow you to save a viewing position/orientation to be restored any time you see fit.



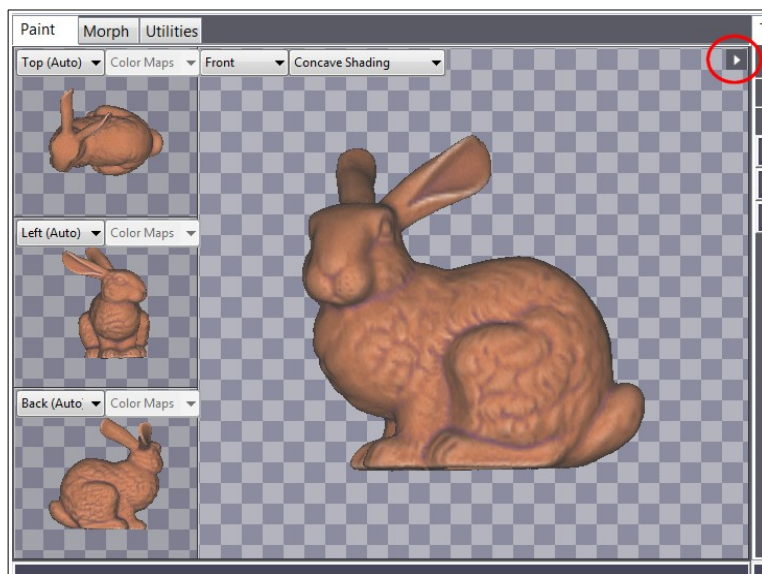
## Viewports

### Viewport Configurations

In Blacksmith3D, you can utilize 1-4 viewports simultaneously to view and edit your 3D models. The current viewport can be maximized or restored to quickly fill the screen with a single view, or restore all of them for multi-angle viewing.

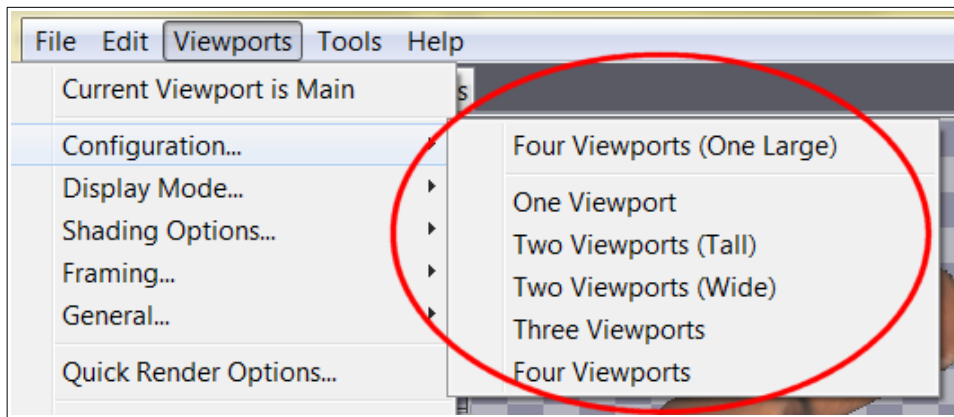


Again, we will use the Stanford bunny for this example. After loading the model, choose **Menu-Viewports-Configuration-Four Viewports ( One Large )**. Notice how there is now one large viewport, and three smaller ones. You can maximize the main viewport by clicking on the **Maximize/Restore** button at the top-right corner.

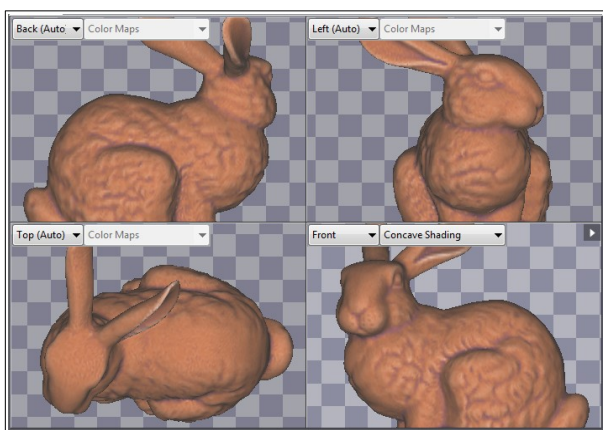
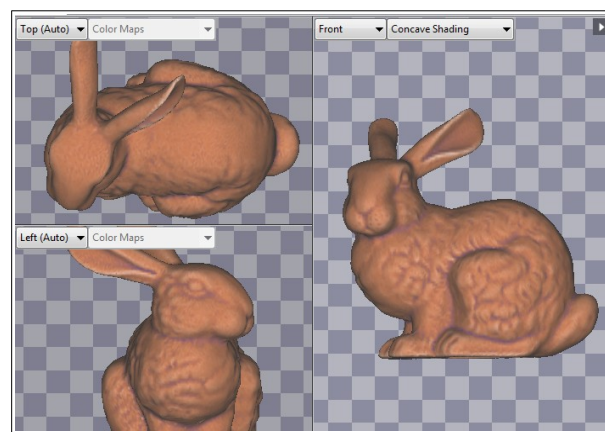
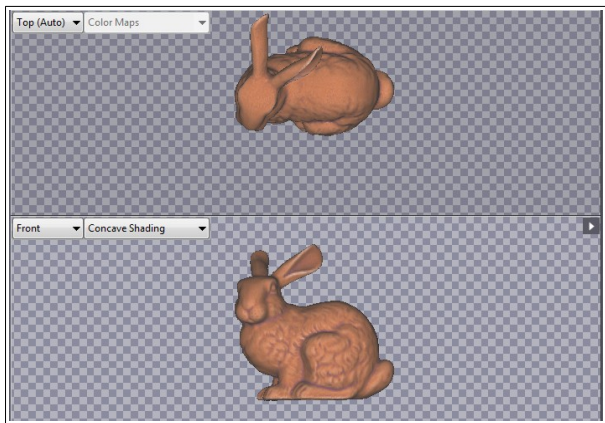
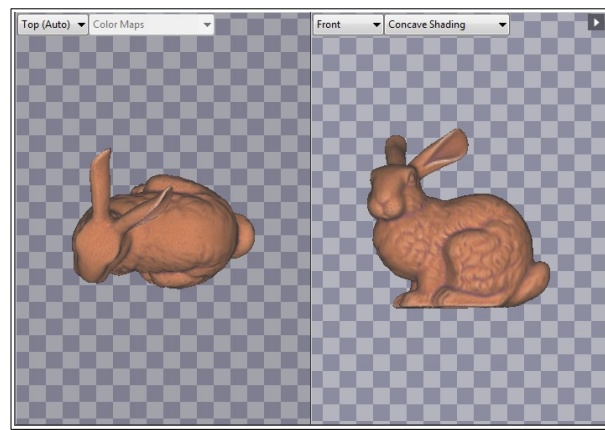
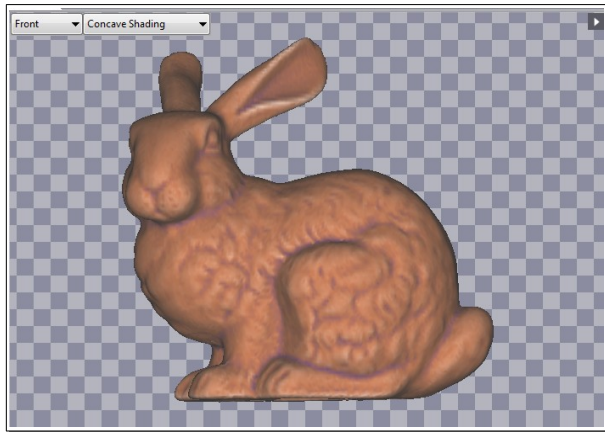


At this point, you will notice that in the other three viewports, the viewing angle is specified, with the word ( auto ) next to it. **Auto** indicates that it's not an absolute direction, rather it's relative to the main viewport. So when you rotate the main viewport, the smaller ones will automatically rotate to be **Top** ( relative to the main viewing angle ), **Left** ( relative), etc. This way, you are always have a good view of the hard to see portions of the model as you are editing it.

Now, let's take a look at the other viewport configurations. You may choose each one to see how the viewports are laid out in the interface, but then restore it to “Four Viewports ( One Large )” when you are done.

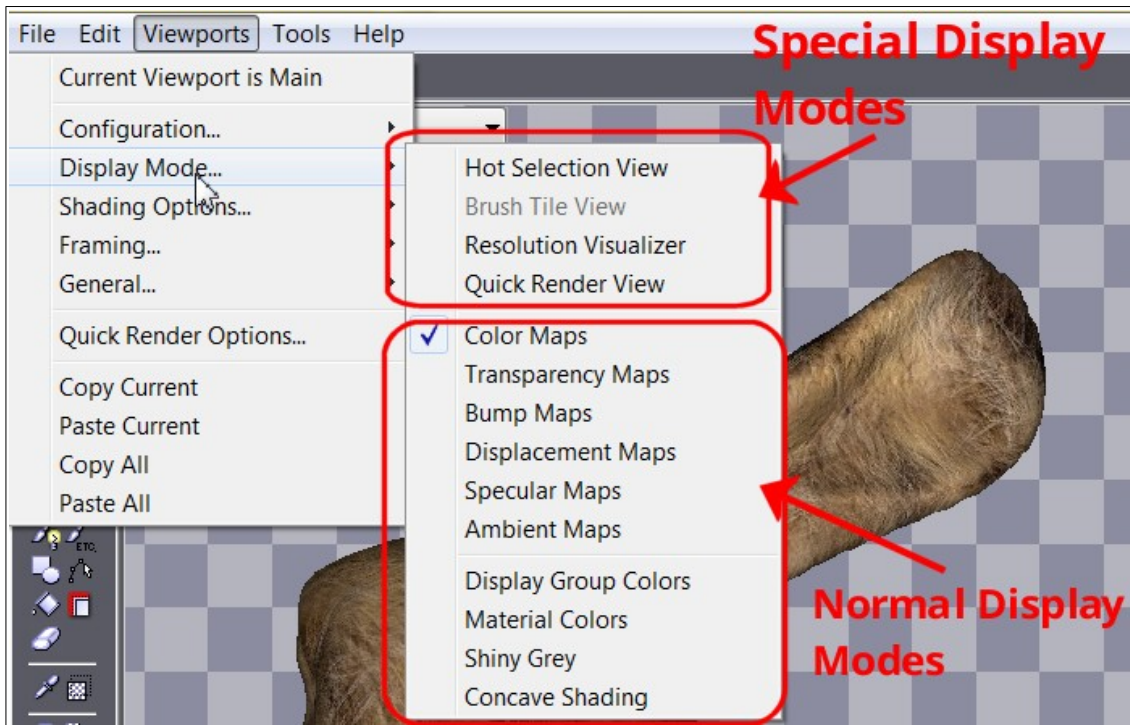


Here we see the other viewport configurations....



## Introduction to Viewport Display Modes

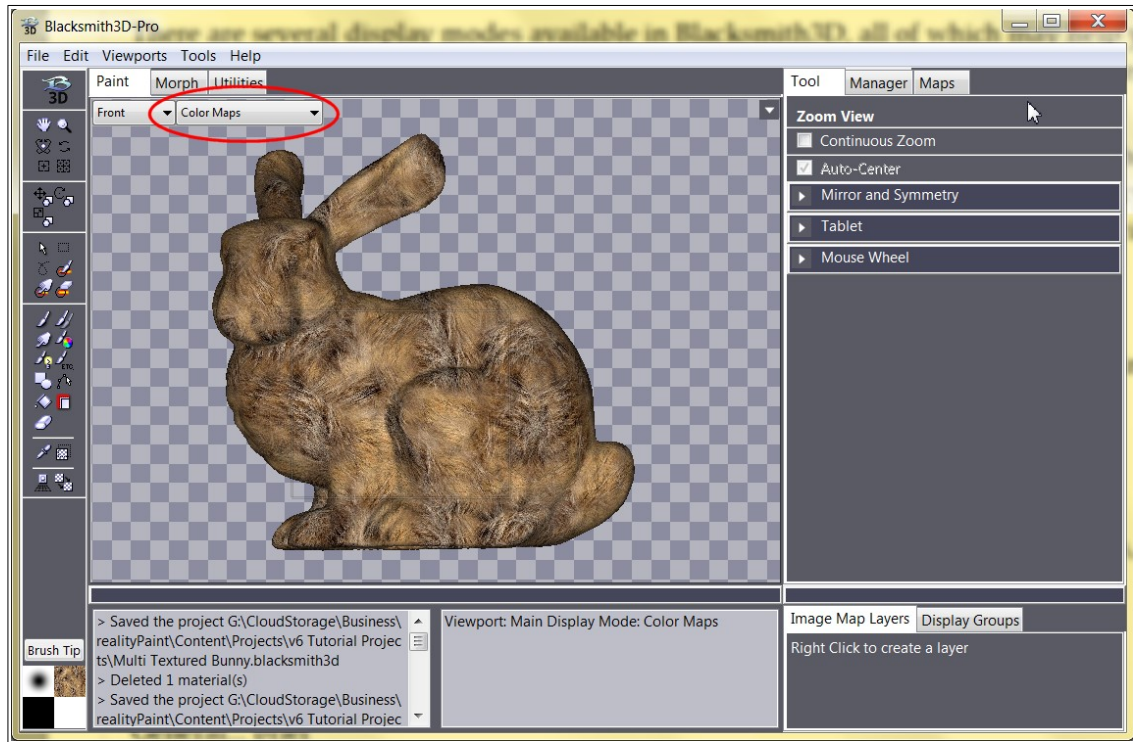
There are several **Display Modes** available in Blacksmith3D, all of which may help you in your projects one way or the other. There are two classifications of display modes; **Normal** and **Special**.



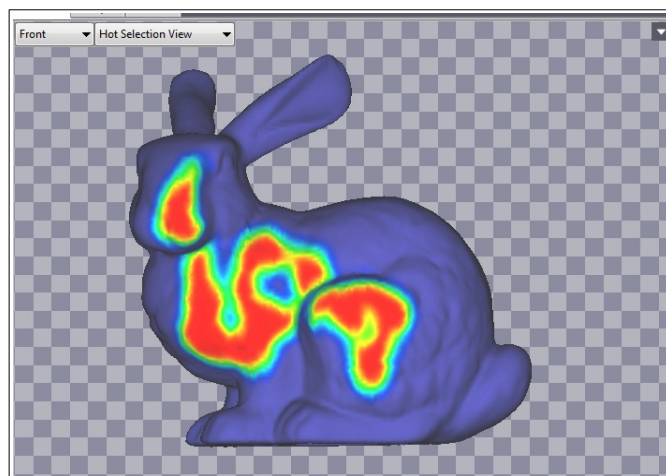
**Normal** display modes are meant to be used for long times during your project. The most common would be all of the **Maps** modes like **Color Maps**, **Transparency Maps**, etc. These modes will display the image maps associated with the appropriate texture channel.

Please load the file **Textured-Bunny.blacksmith3d** by dragging and dropping it into the viewport, or via **Menu-File-Open Project**. Then choose **Color Maps** from the **Viewports-Display Mode** menu.





Notice how the color ( diffuse ) map is now being rendered on the viewport. Until you change the display mode to another “Normal” one, all of your painting operations will be applied to the color maps, and not your bump maps for example. However, while you are painting your color maps, you may wish to quickly view the model in another way. For example, you may wish to use the **Hot Selection View** to visualize the state of your selection. To do this, choose **Hot Selection View** from the display mode dropdown, or press **SHIFT+SPACE**.



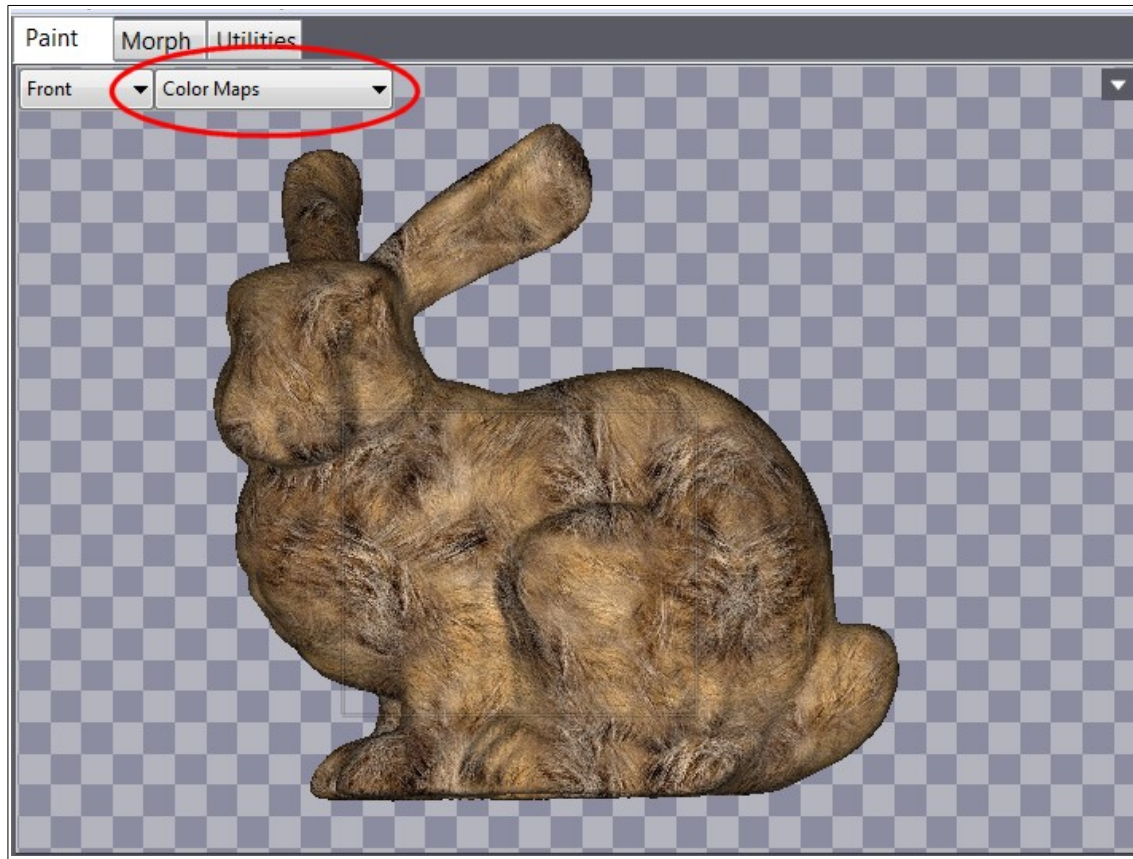
Here we took the liberty of creating a simple selection to help illustrate the point. You can learn about making selections in other tutorials.

Now, this **Hot Selection View** is a **Special** display mode, which is meant to toggle on and off as you see fit. Press **SHIFT-SPACE** again to toggle back to the previous **Normal** display mode, which should be **Color Maps**.



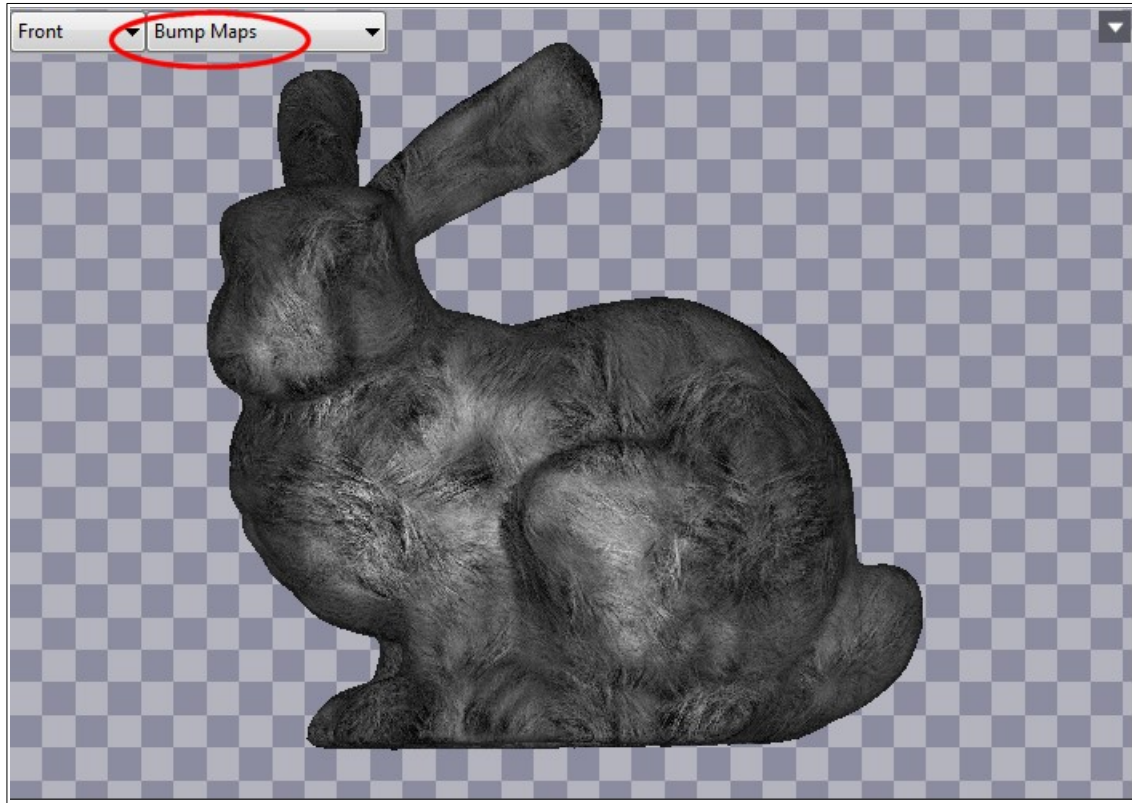
You may also toggle the **Resolution Visualizer** if you would like to see how the UV mapping looks as illustrated by a color grid. Again, you can choose it from the drop-down.

Again, if you choose **Resolution Visualizer** again ( perhaps via a custom hotkey ), it will toggle back to the normal display mode.



Now, let's choose another **Normal** display mode. Choose **Bump Maps** from the dropdown. Now, as you would expect, the surface is displaying the bump maps... not the rendered version which creates the bump effects, but the greyscale bump maps as they appear in the source image(s).

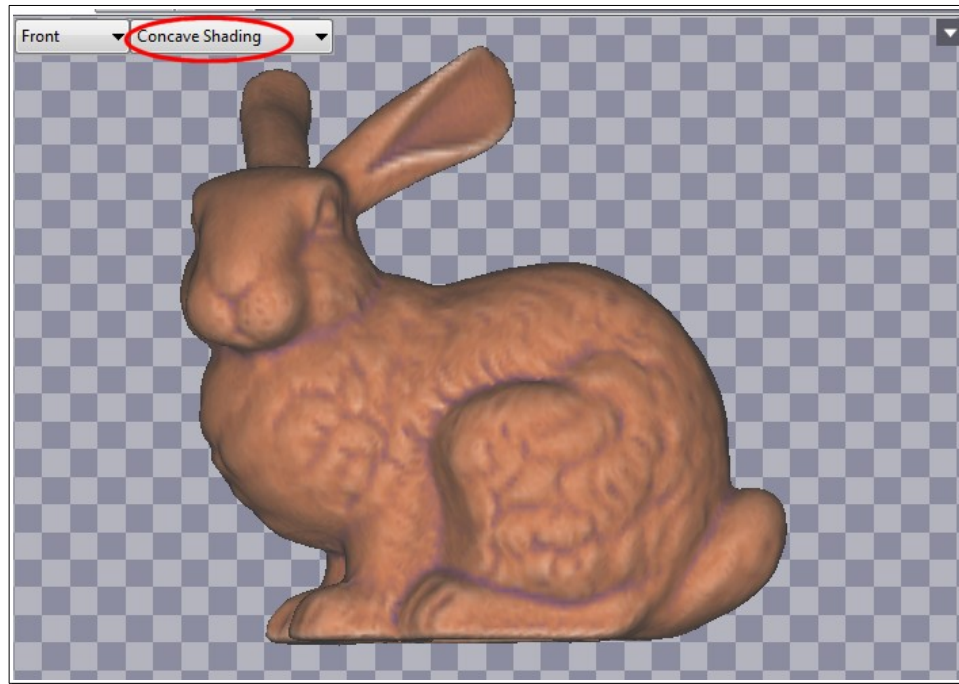




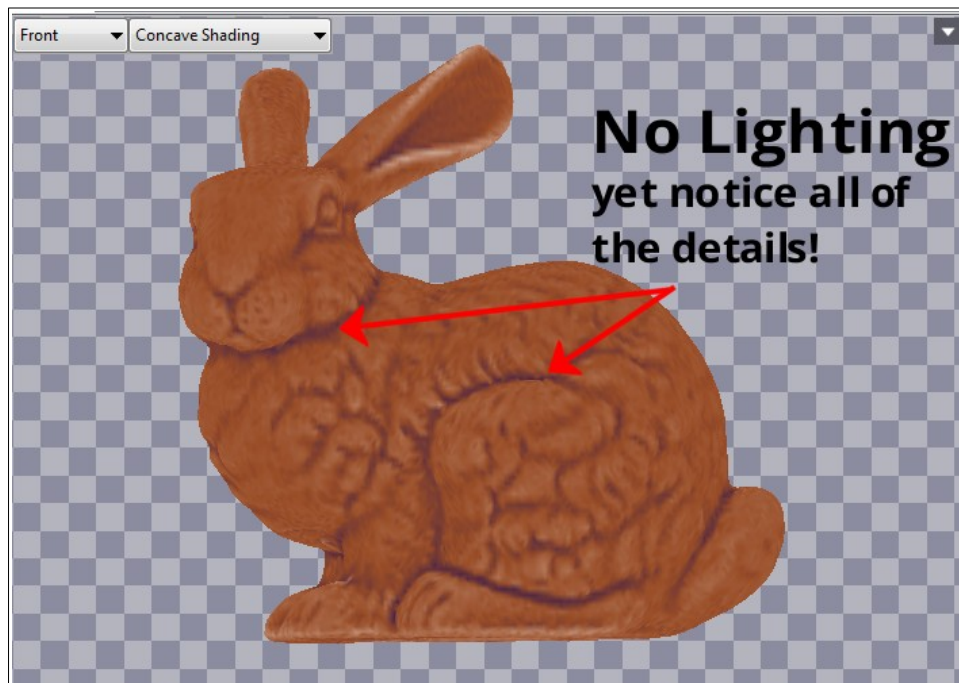
Now, if you toggle any of the special display modes on and off, they will come back to **Bump Maps**. It may seem like a trivial thing, but it is very important to the work flow. By rapidly returning to the normal display mode, you do not have to explicitly choose it every time you quickly use a special mode.

We will not show all of the “map” display modes here as they behave the same as color and bump. But let's now show a few other normal display modes that do not show the maps.

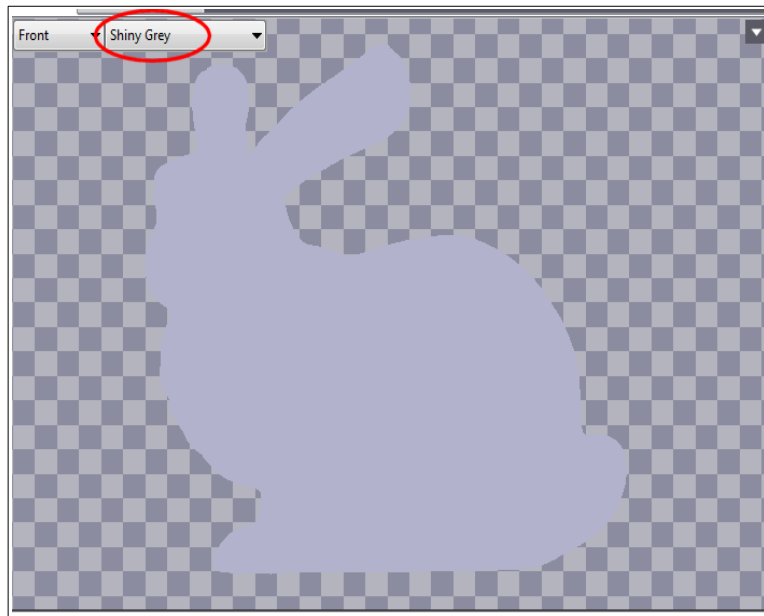
If you are creating a morph target, you will certainly want to use the **Concave Shading** display mode often. This mode was designed to accentuate the subtle variations in the mesh that may not be obvious from the lighting effects alone. So with that being said, choose **Concave Shading** from the drop-down.



At this point, its effect may not be completely obvious, but if you press the 'G' hotkey to toggle the light off, you can see that much of the detail is still visible.

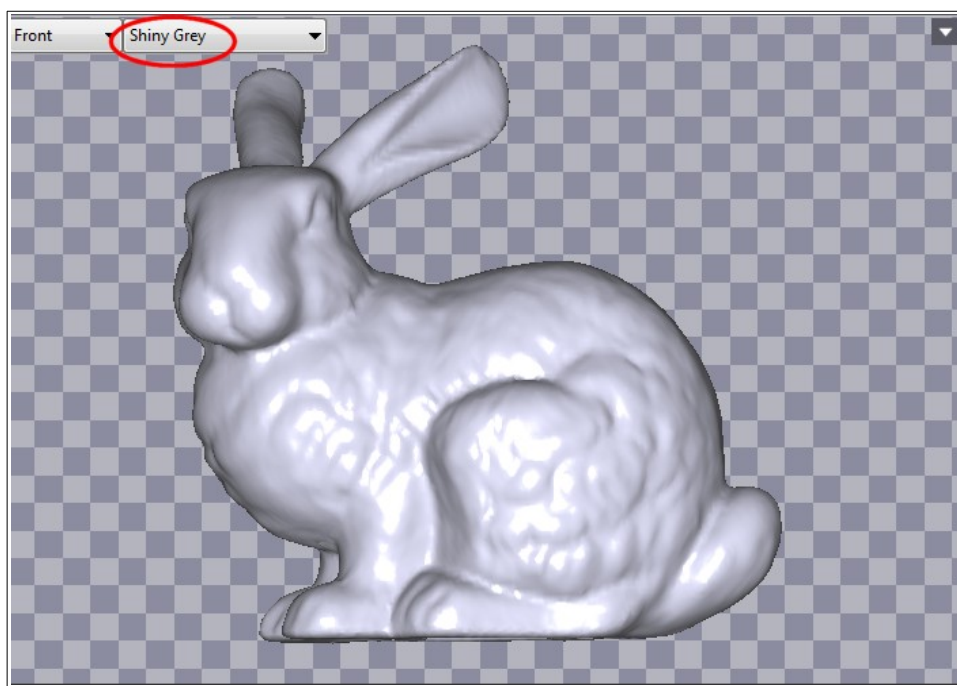


To further illustrate the point, let's look at the **Shiny Grey** display mode with no lighting...



So, if you are creating morphs with lots of rough and intricate details, it should be obvious that **Concave Shading** will allow you to see them with clarity.

Another normal display mode is **Shiny Grey**. Turning the lights back on with the 'G' **hotkey**, we can see how it looks. It can also be a good viewing mode for morphing since the highlights will accentuate many of the details, but it will be dependent on the viewing/surface angles, so **Concave Shading** may be preferable.

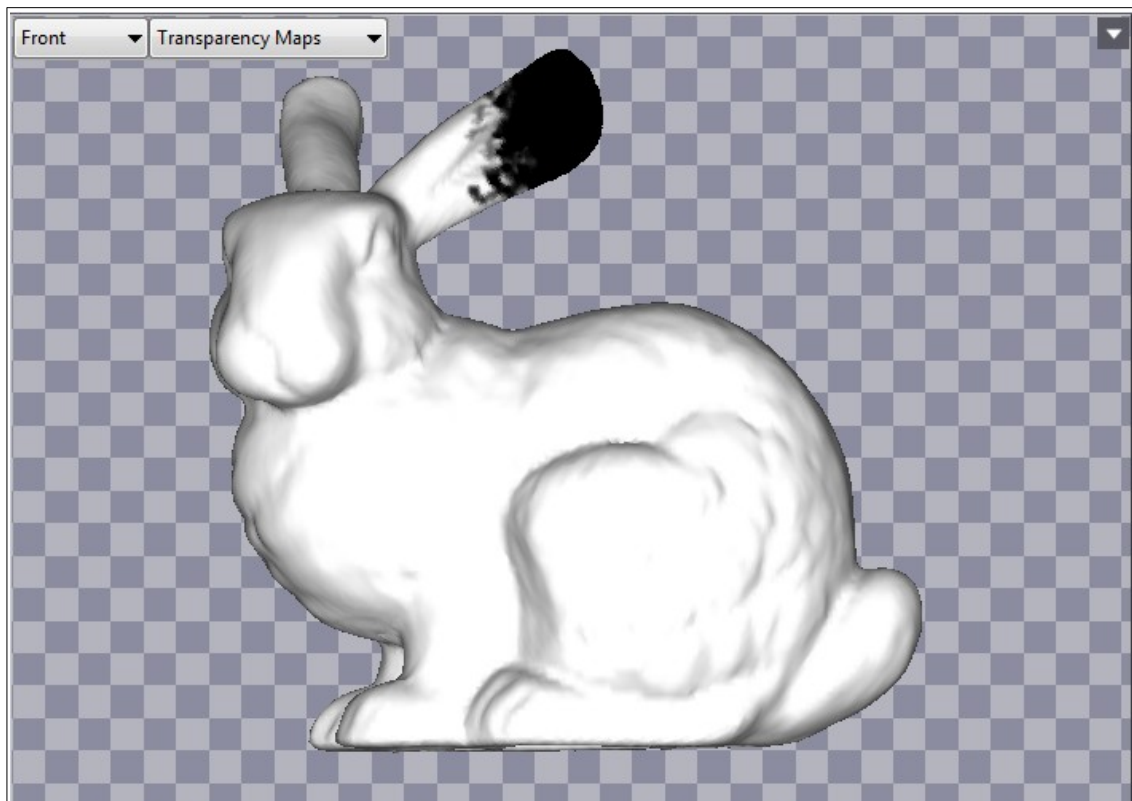




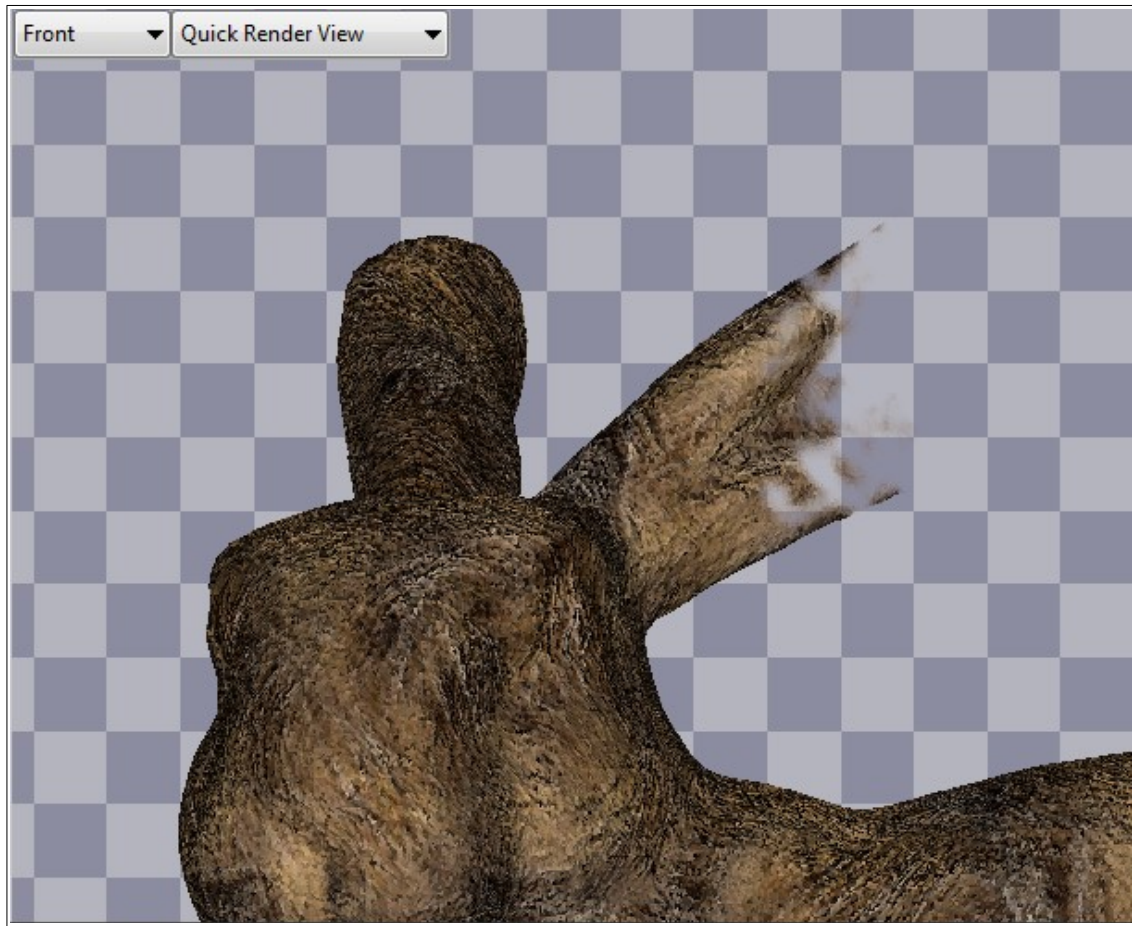
Now, we are going to show you the **Quick Render View** display mode. This is a special display mode, since it designed to show you a quick illustration of how all of the maps will combine in a rendering environment. A few things to note are...

- Since it is a “quick renderer”, it is **not designed for producing final images**.
- The lighting will be illustrated with “flat shading”. This was a necessary sacrifice so we can use the bump and displacement maps in real time, while most rendering solutions will have to pre-prepare these maps ( which can be slow )
- The strength of the effects may not be consistent with your rendering solution, so you may have to tweak the strength values in Blacksmith3D and/or your renderer.

Anyway, before we look at the quick renderer, choose **Transparency Maps** so you can see that the tip of the ear is painted black, indicating that it should be transparent in the render.



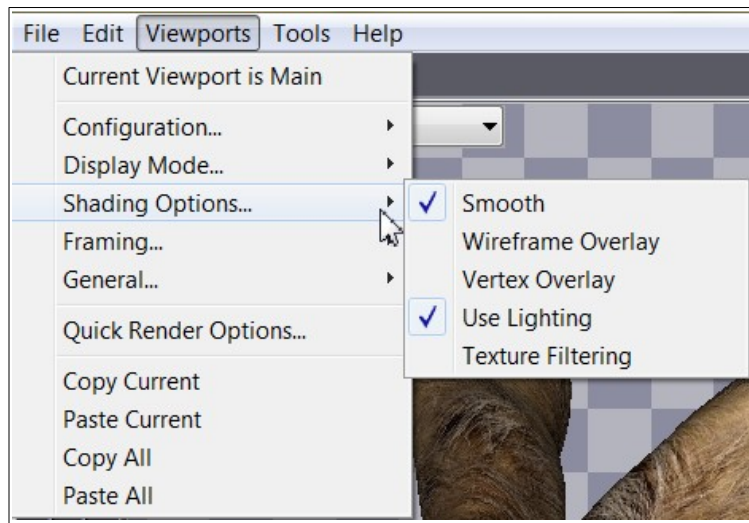
Ok, now, let's look at **Quick Render View** to see what the result looks like. You can use the “**R**” **hotkey** to quickly toggle the Quick Render View. Notice how the ear tip is now transparent, and how the bump map creates the bumpy surface.



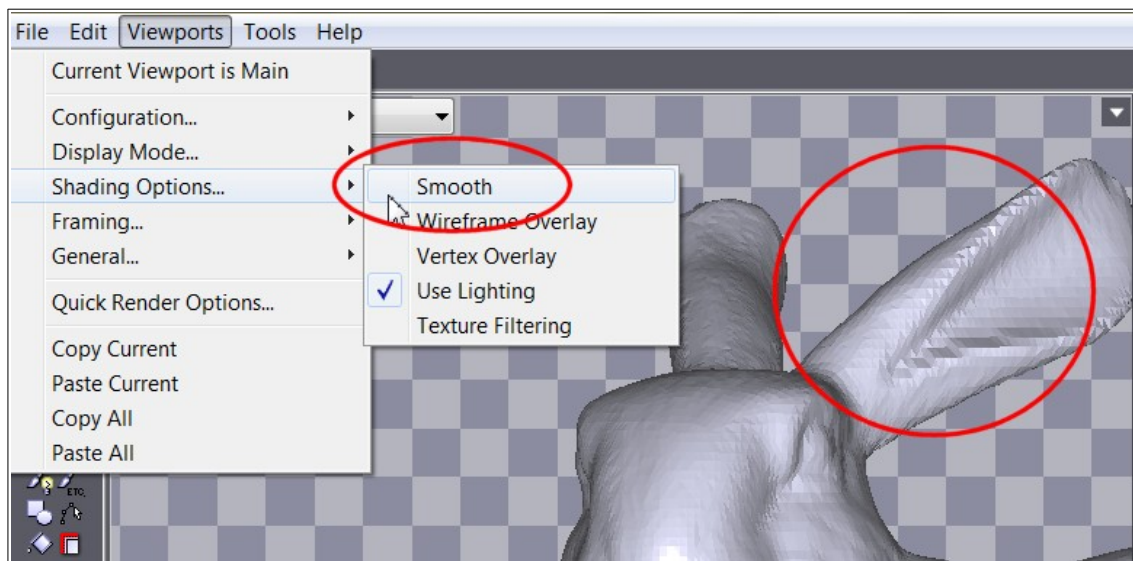
Press “R” again to turn off the Quick Render View.

## Viewport Shading Options

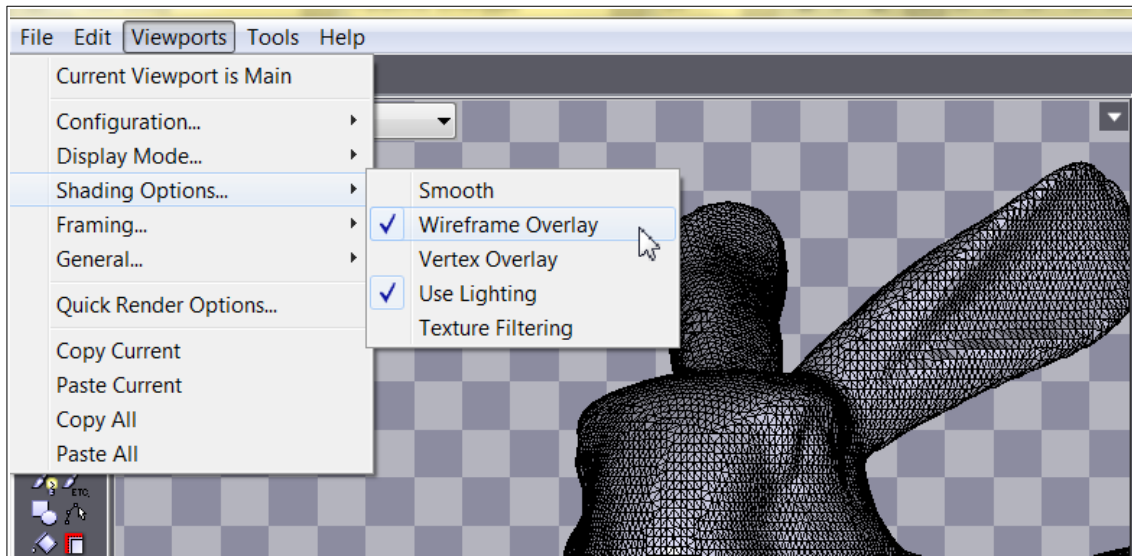
At some time or the other, you may wish to change the shading in the viewport. The options are found in **Menu-Viewports-Shading Options**



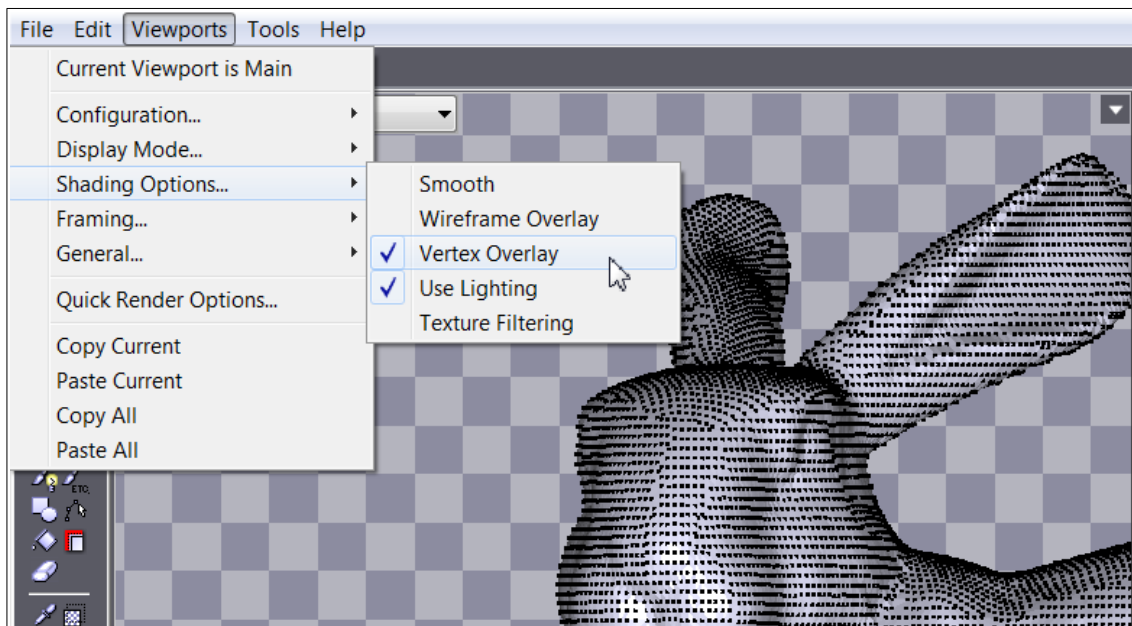
By default, **Smooth** and **Use Lighting** are enabled while the other options are disabled. There are times when you want to be more aware of the actual geometry of the model. You may wish to disable **Smooth** so you can clearly see the facets.



Likewise, you may want to see the **Wireframe Overlay**, which can be toggled using the “O” hotkey

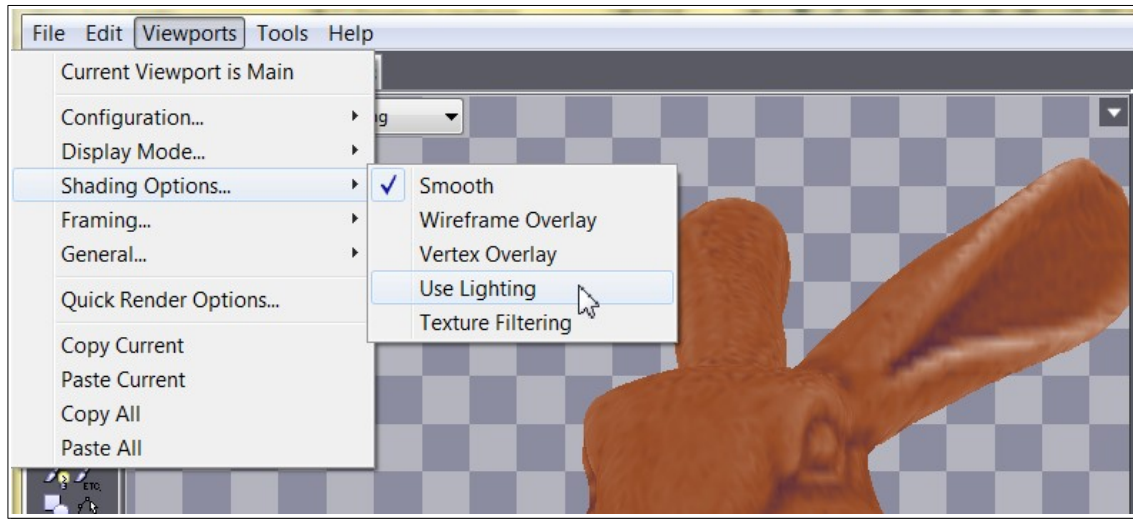


and finally, you may wish to see the **Vertex Overlay**

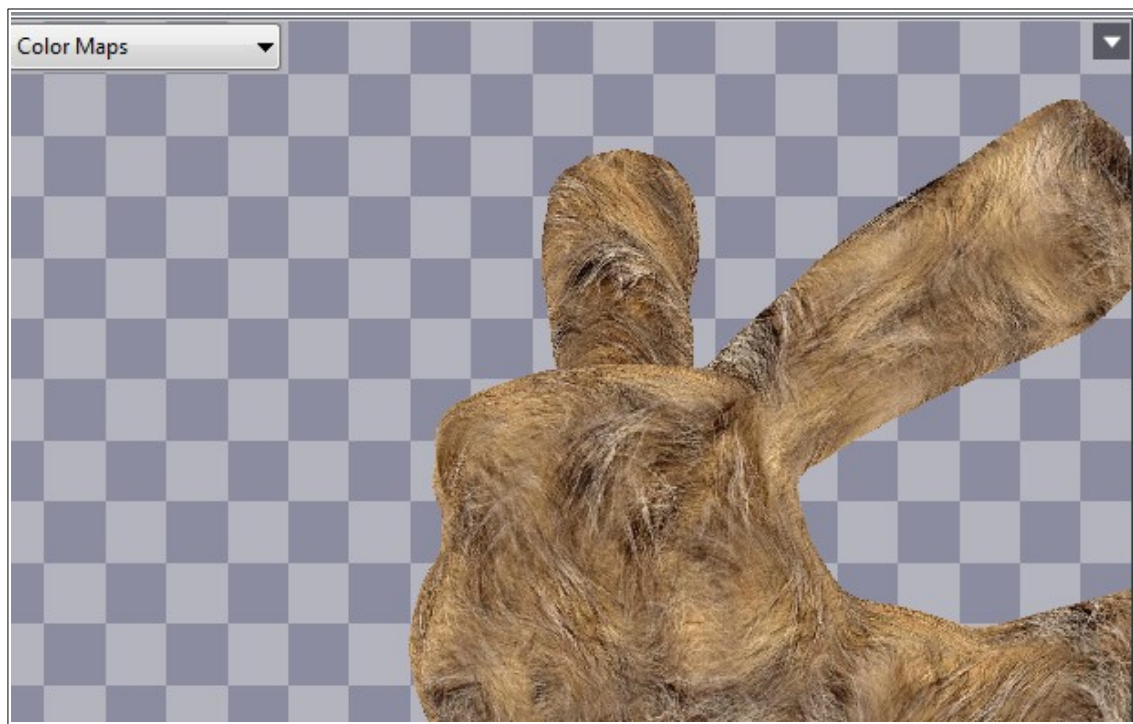


There are some situations in which you will want to disable the lighting. One good example is when using the **Concave Shading** display mode, disabling lighting may be preferable as you can see the intricate details evenly over all surfaces.

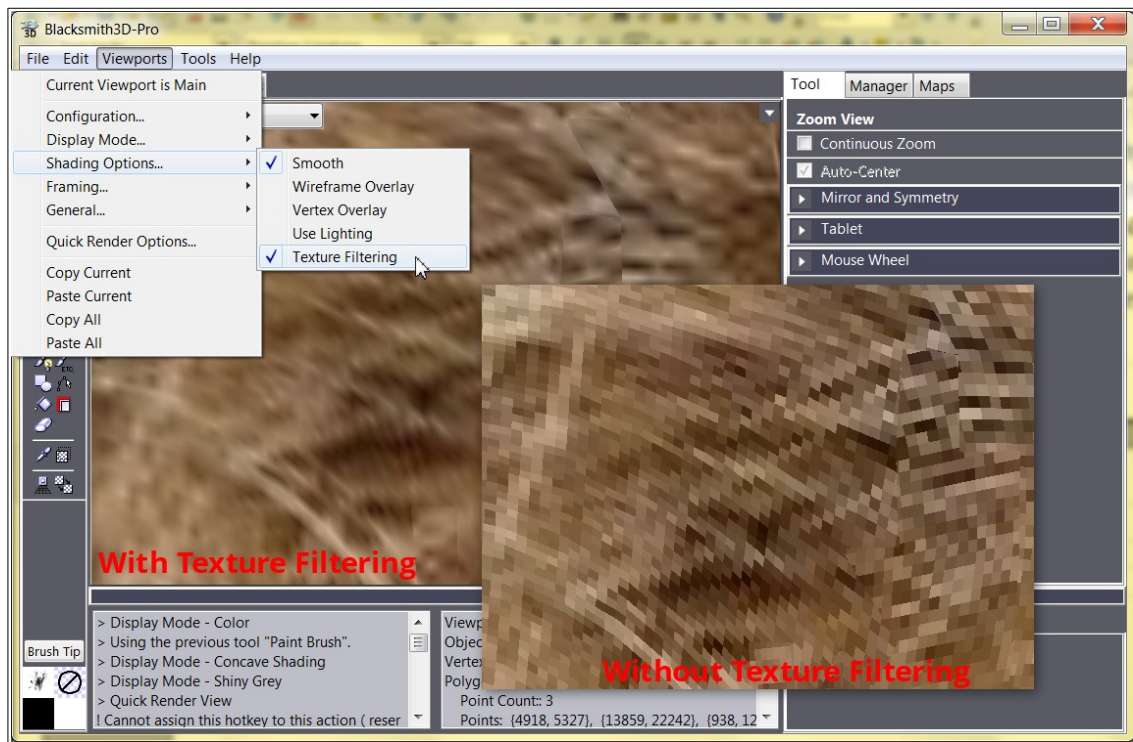




Likewise, you may want to see the textured surface without lighting as well...



Finally, we have the **Texture Filtering** option. When enabled, the color between neighboring pixels will be smoothed together. You may ask yourself, why is this not the default option? Well, since Blacksmith3D is a texture editor, it is more important that you can clearly see each pixel ( when zoomed in ) so you can make decisions involving resolution, UV issues, etc. However, you will probably want to see how the texture looks when it is indeed “smooth”, so for those occasions, use **Texture Filtering**.



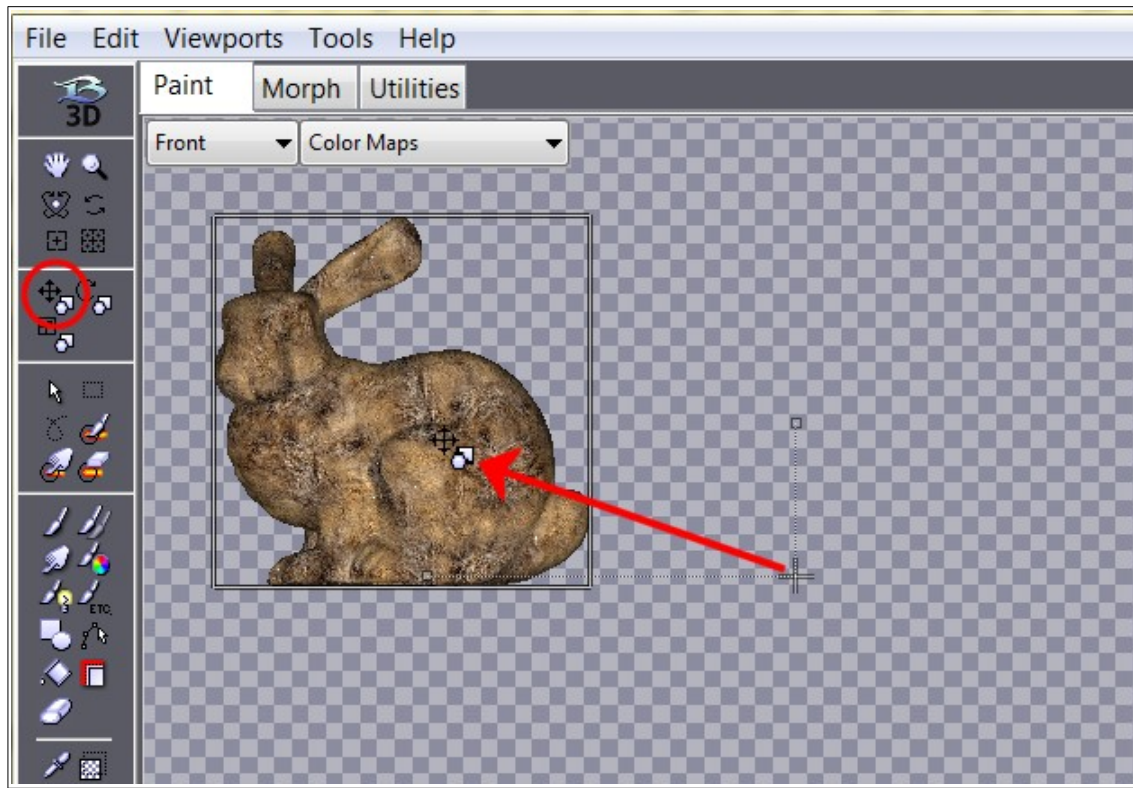


## Transformations

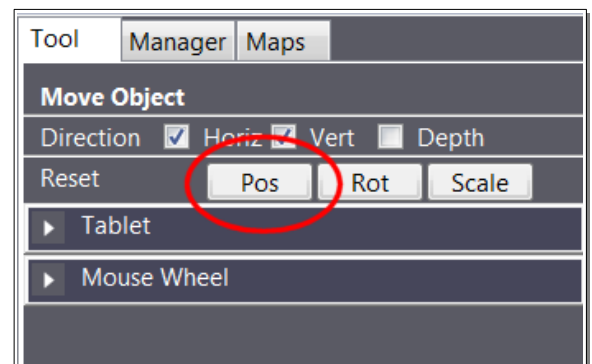
Transformations are used in the Blacksmith3D work flow mostly for managing photo-references, or if you are editing more than one object at once. They act on whole objects, and not on partial selections ( like hammer deformer ). Also, their effect is temporary in nature since transformations are removed when exporting files.

### Basic Transformations

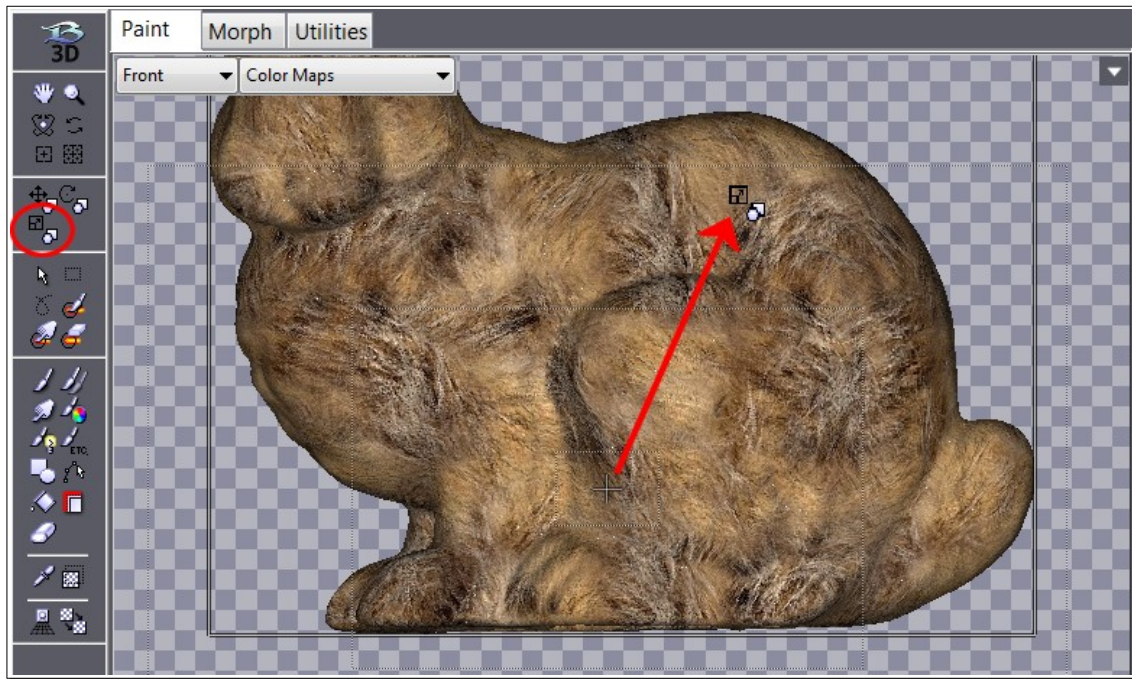
Let us start by loading the **Textured-Bunny.blacksmith3d** file. Then click on the **Move Object** tool. Click and drag in the viewport to reposition the object in the scene.



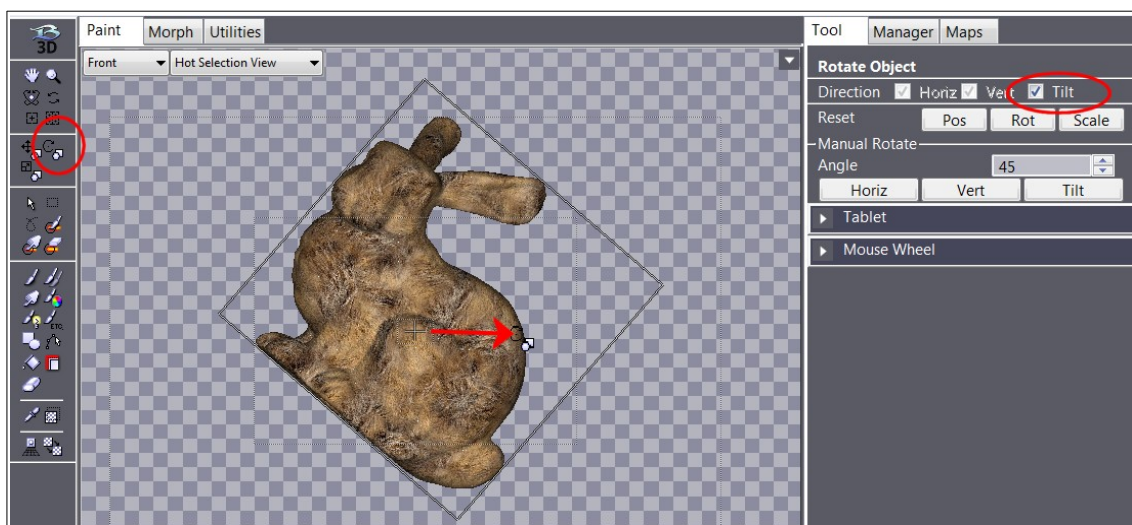
To reset the original position (  $\{0,0,0\}$  ), click on **Reset Pos** in the tool window.



Likewise, you can Rotate or Scale the object using the respective tools. Choose the **Scale Object**, then click and drag in the viewport, then click on **Reset Scale**.



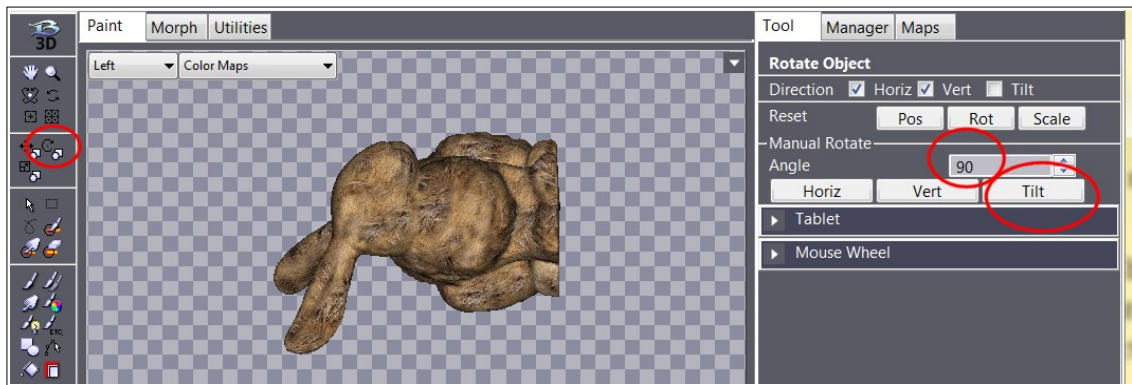
The **Rotate Object** Transform works in the same way, so we'll leave it to you to do a few free form rotations. Also, try changing the direction controls to see how they alter the rotation.



Now that all seems somewhat easy and straight forward. Now, here is something more useful and perhaps slightly less obvious...

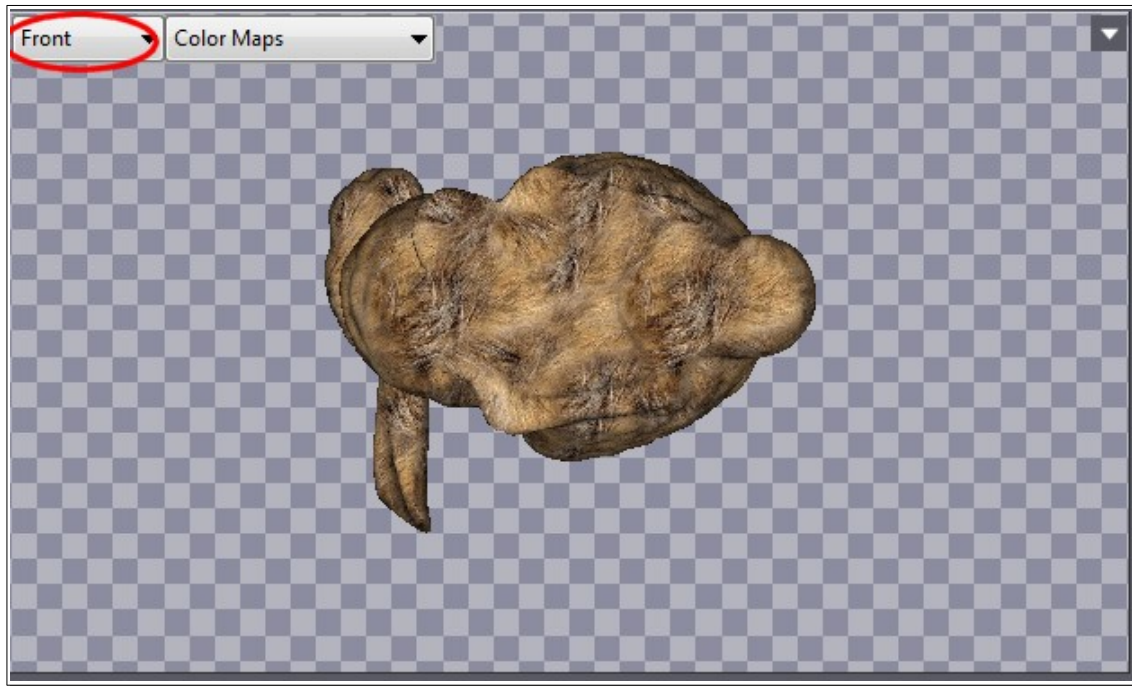
Often when you import objects from other applications, their “**up**” direction may be different from that in Blacksmith3D ( positive Y is up ). In that case, you may want to make a 90 rotation so when Blacksmith3D's viewports are set to **Front**, the object appears to be facing the front as expected.

To simulate this problem, press the left arrow key to view the object from the left. Then in the **Angle** field, enter 90 (degrees ) and then click Tilt.

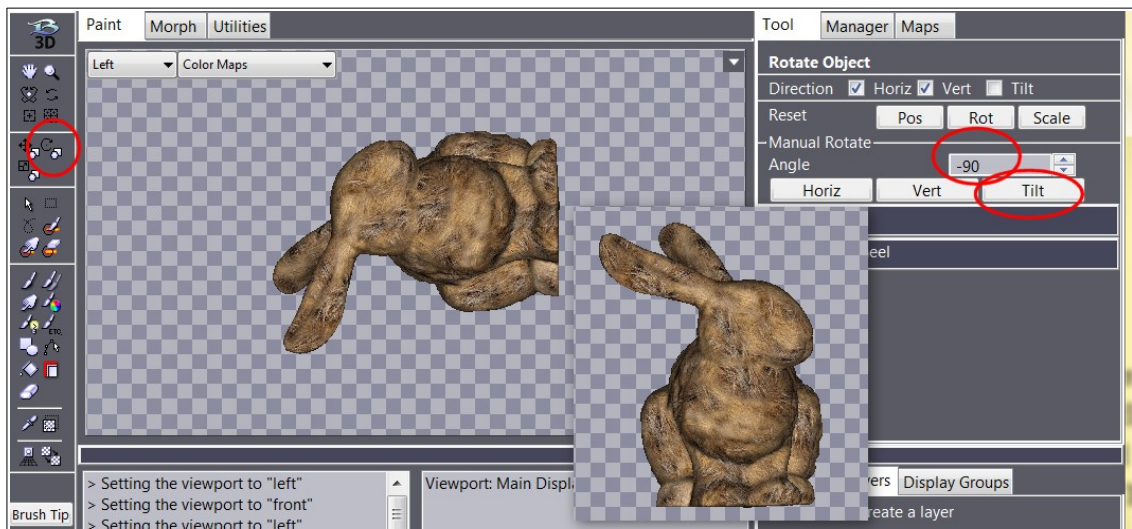


Now, pressing the **DOWN** arrow on the keyboard to view the model from the front, this is what we might see if we imported an object from a program that uses Z as the up axis.

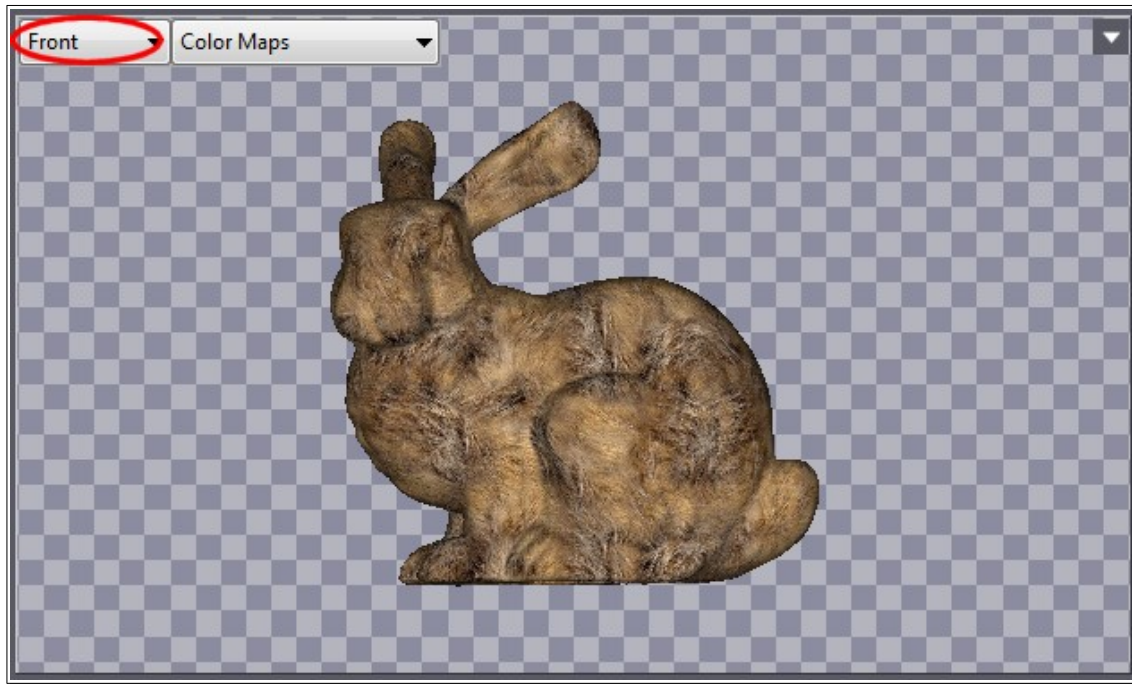




Now, we could simply edit the model like this, viewing it from the top when we mean to view the front, etc. but it will surely get us confused and slow down our work flow. So, let's simply rotate it into place. Click on the **Rotate Object** tool again and press the LEFT arrow to view it from the side. Enter the value -90, then click the "Tilt" button.



Pressing the DOWN arrow key again to view the model from the front, we now see the model as we'd expect it to be. Please note that you could have done this with a vertical rotation from the front viewing angle, but its often easier to visualize the tilt rotation, since it takes place in the plane of the viewport ( a.k.a. It's appears to be a 2D rotation )



Now, the advantage of using this method of rotating the model to fit with Blacksmith3D's viewport standards is that any exported model will be unaffected by the transformation. If you re-export the model, it will have the original orientation, so when you re-import it into the original 3D program, it will appear as it did before.

## Selections

Blacksmith3D has been designed using a selection based work flow which is meant to mimic the functionality of most 2D painting applications. With that being said, most tools adhere to the following logic.

- If **nothing is selected**, then the tool will **act on everything**. This is like using a 2D painting application, without using the marquee tool to select a rectangular region.
- If **something is selected**, the tool can **only act on that selection**. The strength of the selection will determine “how much” of an effect the tool will have. This is like making a selection in a 2D application using “feathering”, which results in a smooth transition from the selected to unselected regions.
- Most selection tools can replace, add or subtract from the current selection. The work flow is identical to most 2D painting applications. The default action is to “replace” the current selection, holding SHIFT adds to the current selection and holding ALT subtracts from the current selection.

### The exceptions to these rules are...

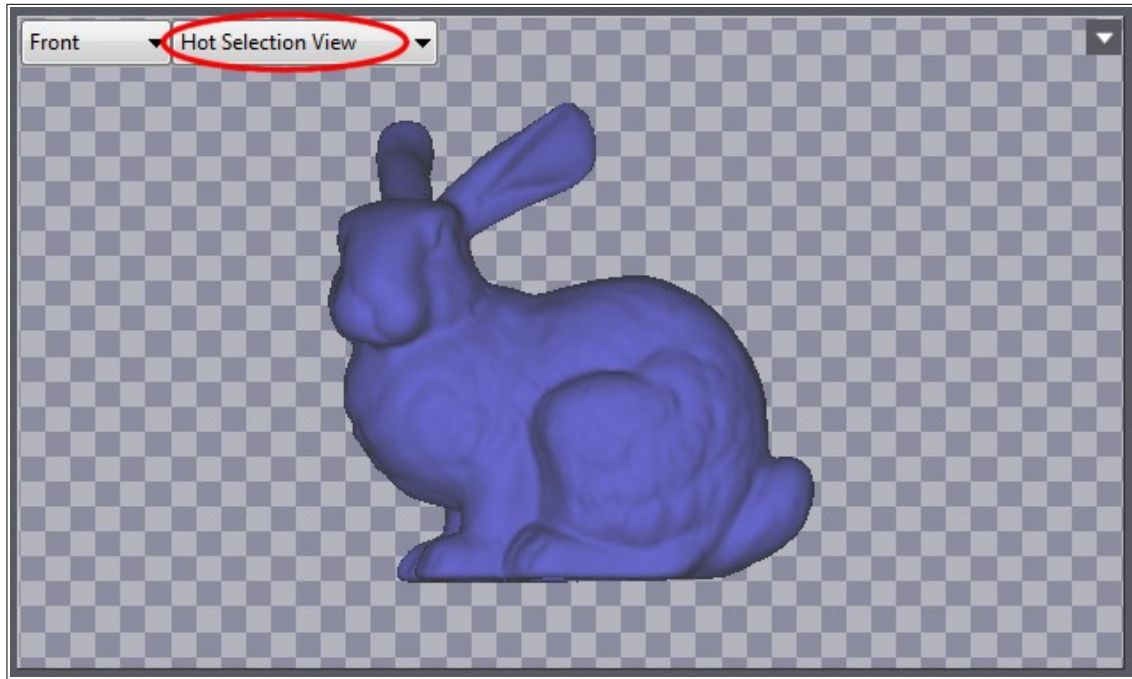
- **Hammer** deformation tools require a selection. If nothing is selected, the hammer will do nothing. If you wish to affect everything with a hammer, then press CTRL-A to **Select All**, and then use the hammer.
- Transformations work on everything, so they will automatically select the whole object when being used.
- Selection tools that modify the current selection values ( e.g. Selection Touch-up ) will not add/replace or subtract, rather, it will modify the current selection values ( e.g. soften )

Now, let us get on with the selection tutorials....

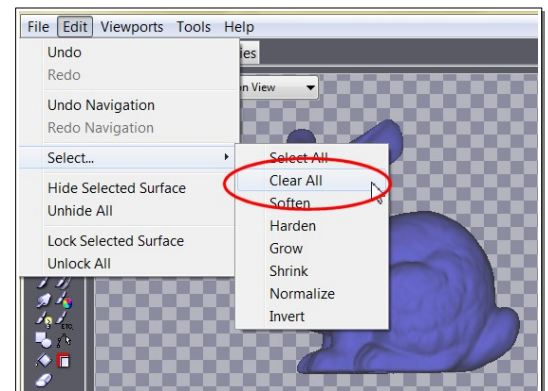


## Basic Selection Workflow

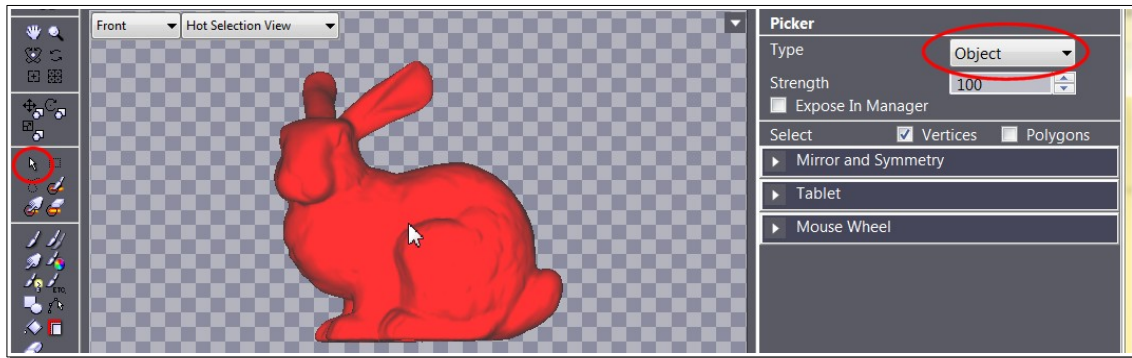
Let us start off with our familiar Stanford bunny. For this one, we need a model that has multiple materials and groups, so please load the “Textured-Bunny-Multi.blacksmith3d” file. Then change the display mode to Hot Selection View ( see [Introduction to Viewport Display Modes](#) for more details.



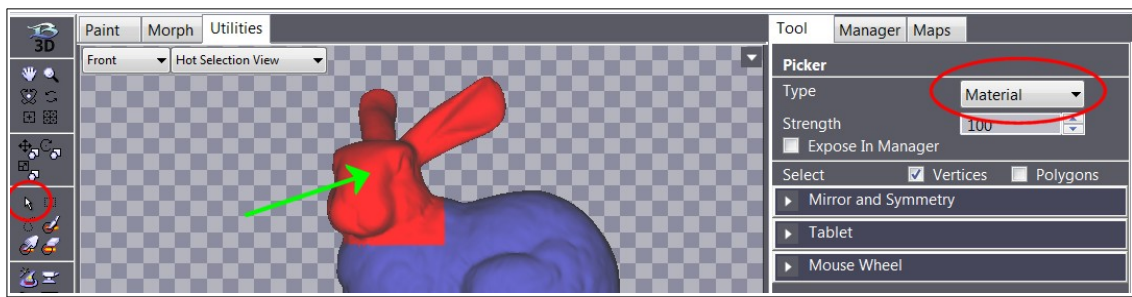
Notice that in the absence of a selection, the object will appear to be a cool blue color. Depending on what you did before, you may also notice the object being completely red. This means that some action you have done before resulted in the object being completely selected. In that case, press **CTRL-U** to unselect everything, or click **Menu-Edit-Select...-Clear All** .



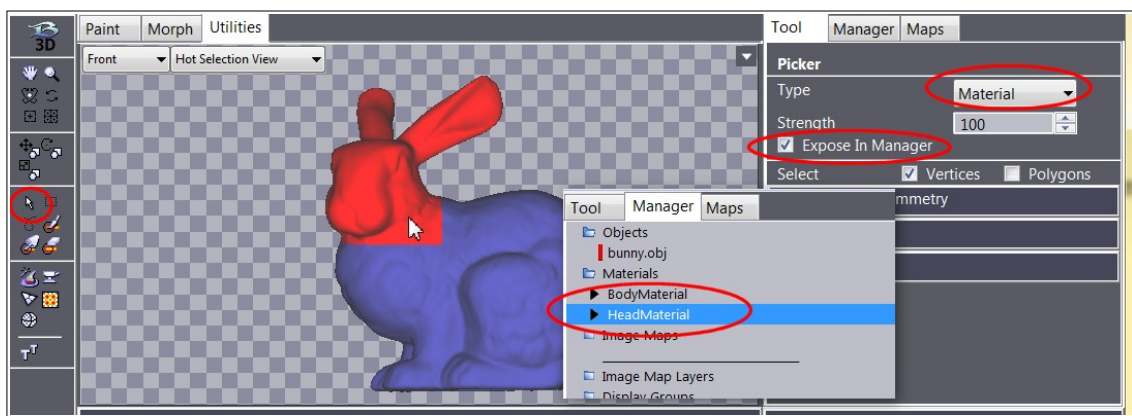
Ok, now we are ready to select something. Let us start off using the **Picker** tool, which allows you to select whole objects, or partial objects depending on the **Type** specified. When the **Type** is set to object, clicking on any part of an object results in the whole object being selected.



Press **CTRL-U** to clear the selection so the object appears to be blue again. Then change the type to **Material**. Now click on the head of the bunny, and notice that all polygons belonging to the same material called **HeadMaterial** have been selected equally.

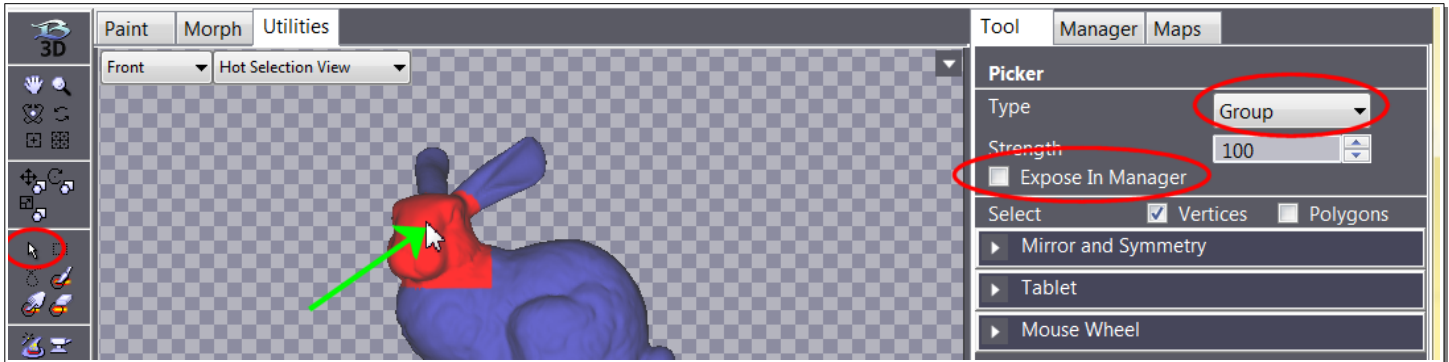


Now, check the **Expose in Manager** option and click on the head again to see the name of the material.

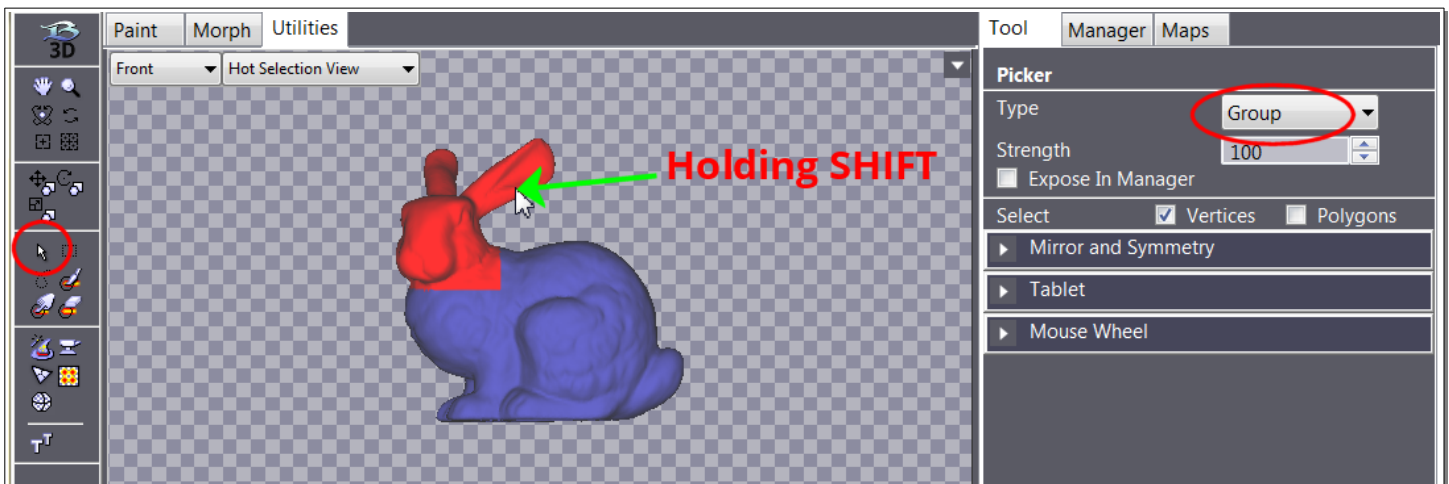


You can duplicate the same procedure using the Types **Group**, **Map**, **Element** or **UV Element**.

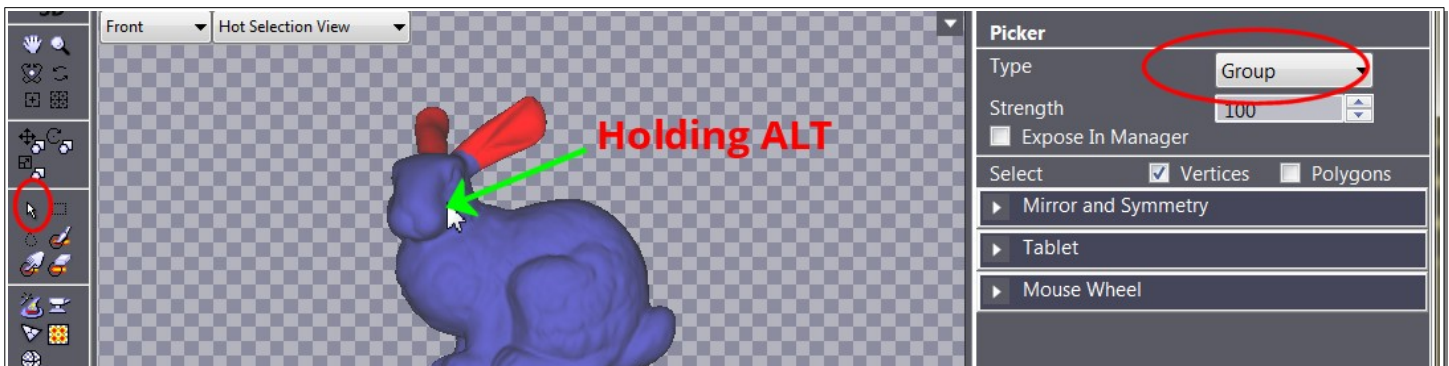
Now, let's add and subtract selection by using the **SHIFT** and **ALT** modifier keys. Uncheck the "Expose In Manager" option, choose the type "Group", and then click on the head.



Now, hold the **SHIFT** key and then click on the ears ( which are in another group )

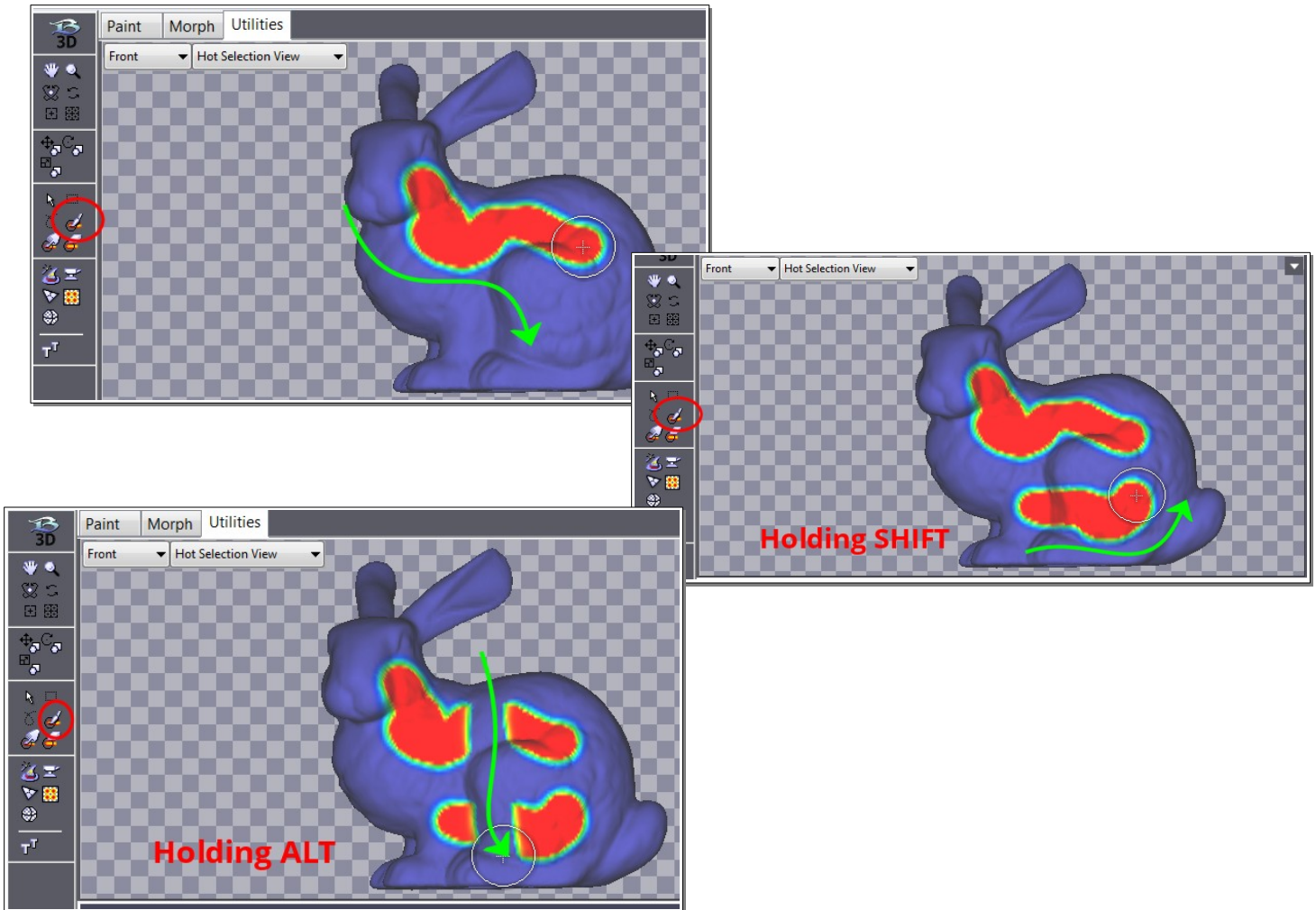


Notice how the new selection ( ears ) is added to the previous selection ( head ). This is the same as the work flow in most 2D painting applications. Likewise, hold the **ALT** key and click on the head again to see it subtracted from the current selection.

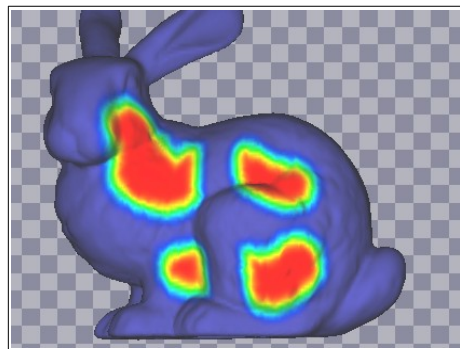




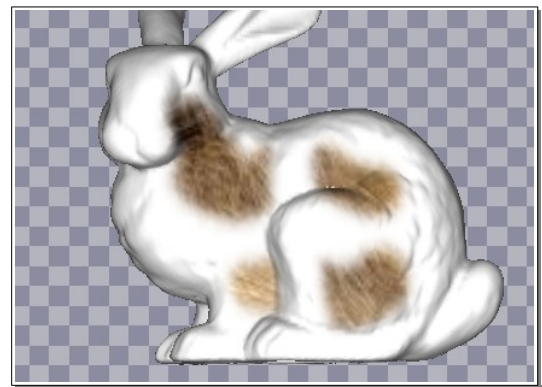
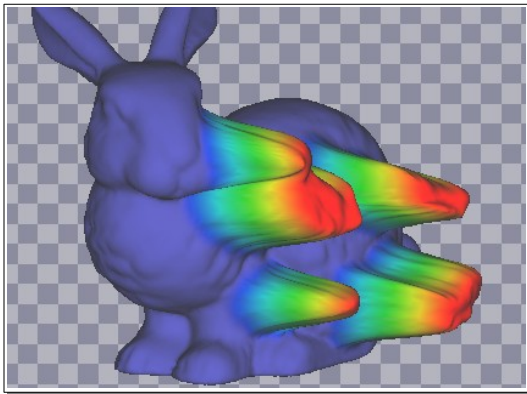
Now that you understand how to add and subtract ( SHIFT and ALT ) selections, let's choose the **Selection Brush** and make a few random selections, replacing, adding and subtracting.



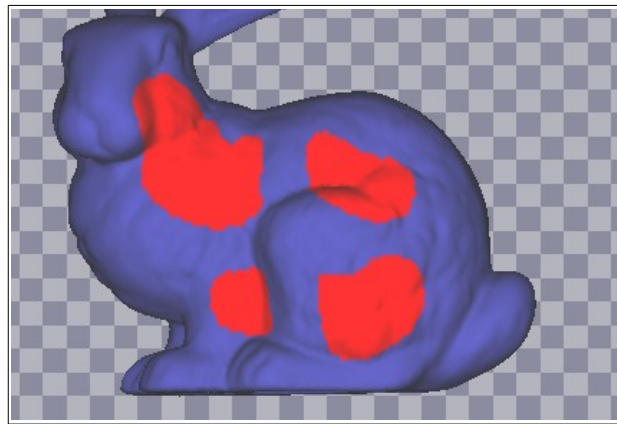
At this time, let's take a look the most common ways of modifying a selection. By far, the most common modification that you will probably make to a selection is to **soften** it. You can soften a selection via the **Menu-Edit-Select...-Soften**, but it's best to simply press the '**S**' **hotkey**. You can press it several times to achieve the desired effect.



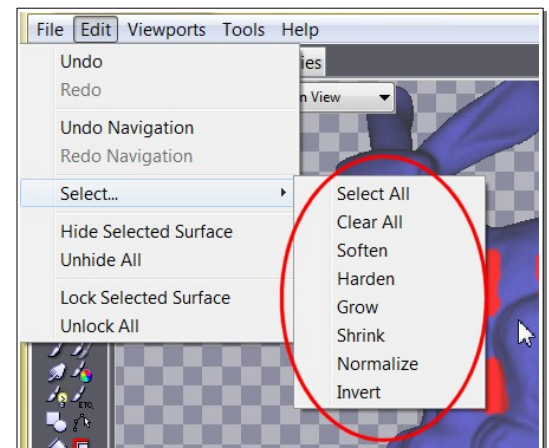
Notice how the transition between the most selected ( red ) and the least selected ( blue ) is wider, providing a more gradual transition. If we used a “hammer” deformer on this selection, it will have a smooth, organic shape instead of a rigid one. Likewise, if we painted over this selection, the paint will fade subtly across the soft transition. We won't get into the specifics of deforming or painting here, but felt it important to note why soft selections are important in the Blacksmith3D work flow.



You can also **Harden** the selection using the “N” hotkey, which will cause the selection to be either “fully on” or “fully off”.



In **Menu-Edit-Select...** , there are several other methods of modifying your selection which we now invite you to experiment with.





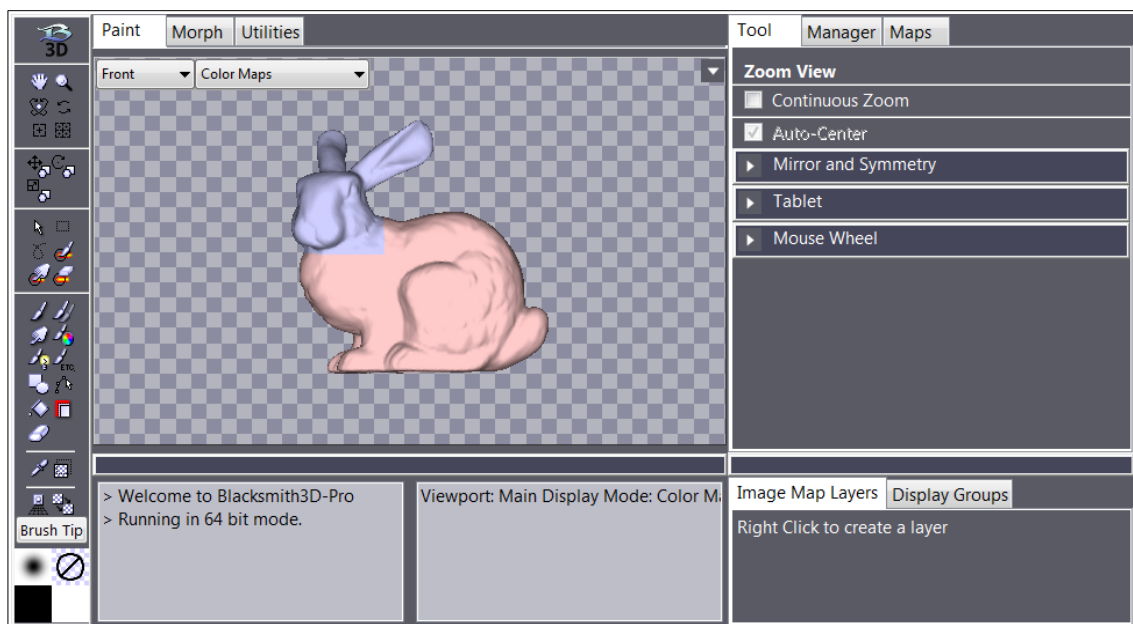
## Painting

The painting features in Blacksmith3D have been designed to “feel like painting in 2D”. As such, you should think of the 3D viewport as a flat projection in 2D most of the time. But given the fact that you are actually painting on a 3D, often curved surface, you must also be mindful of how the depth dimension relates to your paint strokes. As such, you should pay extra attention to how the **Hidden Surface Removal** and **Fade By Angle** ( in **Brush Control** ) features work, since they can solve many if not most of the problems you may encounter.

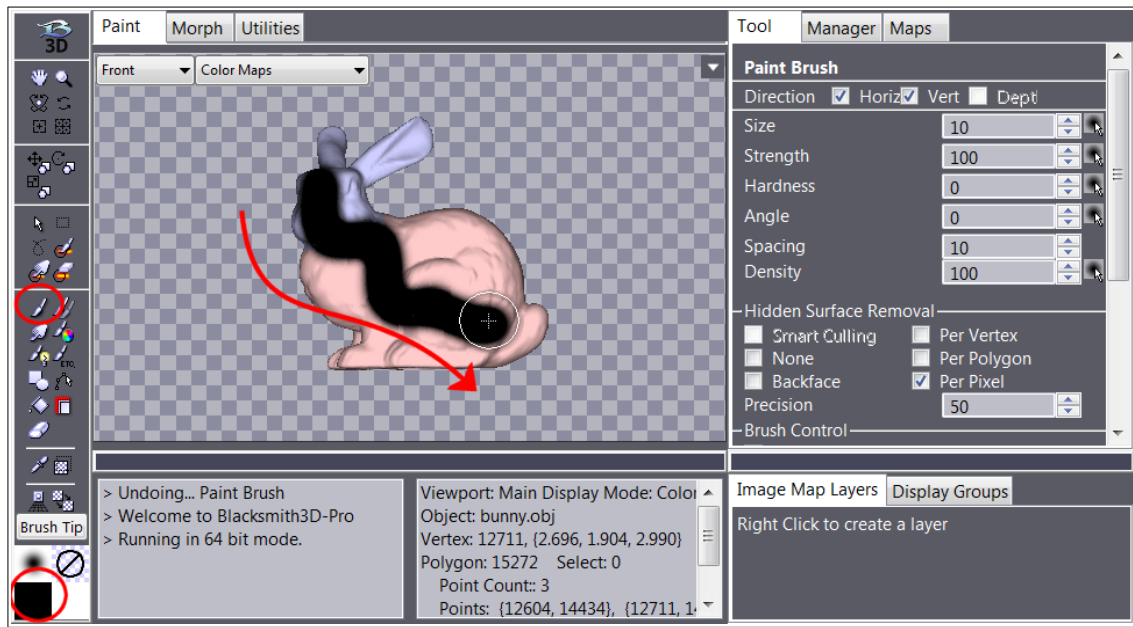
### Simple Painting of Texture Maps

In this tutorial we'll show you the most common techniques for painting a simple texture on texture maps. Once a model is properly setup with one or more texture maps, there few if any consideration that need to be made for painting. The boundary between maps acts the same as a UV seam, and we can paint across it without any problems. To learn how to setup one or more texture maps on an object, please see the Quick Start section.

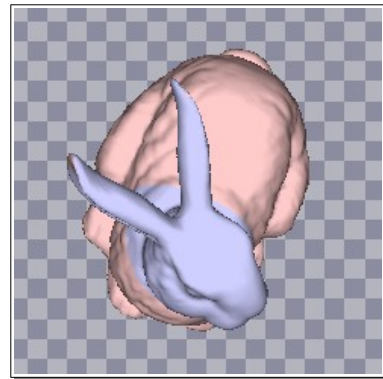
All right. Let's star by loading the **Textured-Bunny-Multi.blacksmith3d** project. Notice how we made the blank texture maps different colors by default. This is to make it obvious that there are indeed two different texture maps.



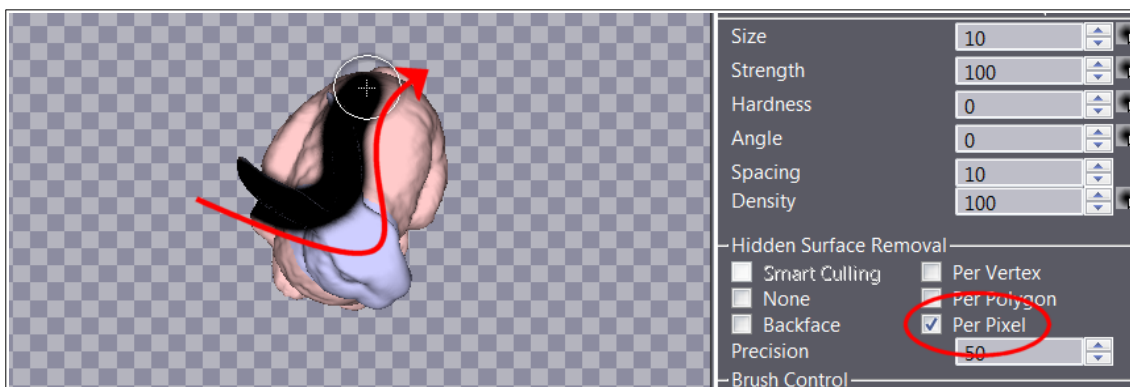
Now, choose the standard **Paint Brush**, and click and drag in the viewport to paint a stroke across the model. Notice how the color matches the **Primary Color** at the bottom-left corner of the window.



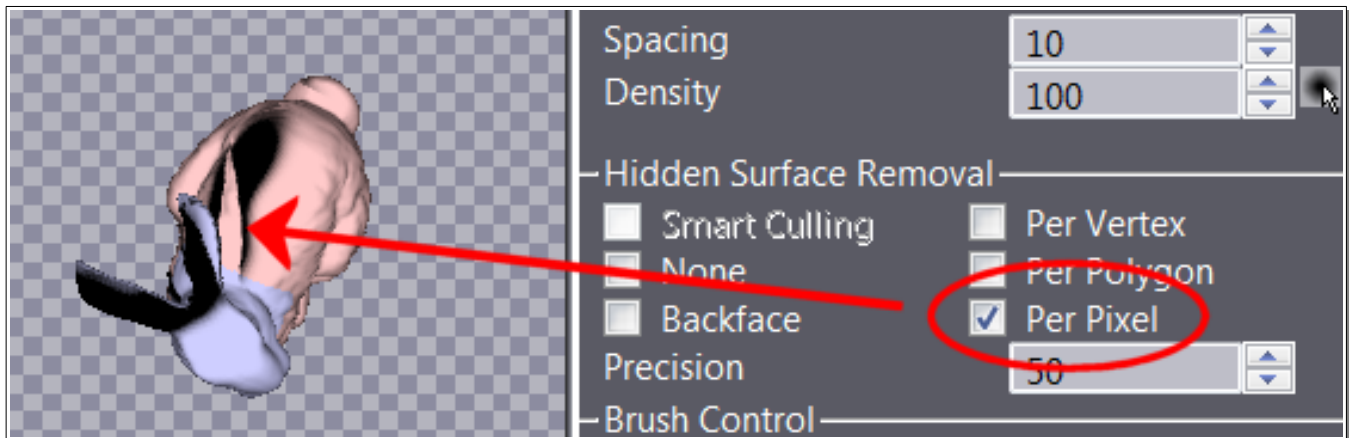
Press **CTRL-Z** to undo the paint stroke. Now, press **F3** to switch to the **Rotate View** tool and click and drag on the head to rotate the view so it looks something like this image. Notice how the ears are in front of the body now. We need this to illustrate the next point. Press **F3** again to return back to the **Paint Brush**.



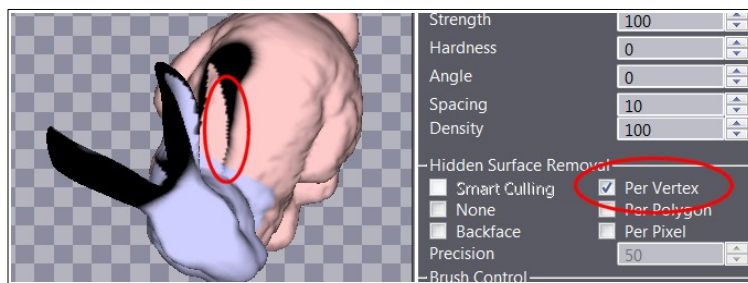
Then paint a stroke across the ears, head and body, noting that the **Per Pixel** method is chosen for **Hidden Surface Removal** by default.



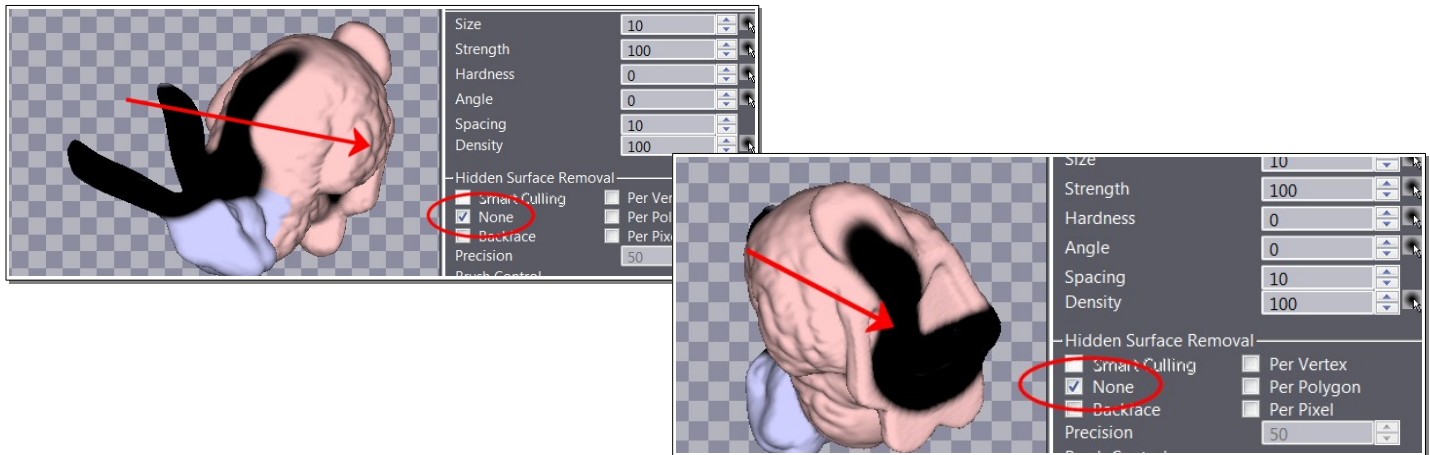
Now, to see why this is important, press **F3** again, and then click and drag in the viewport to rotate the object again. Notice how the paint left a silhouette of the ears on the body. This is because in the original viewing angle, that region was hidden behind the ears.



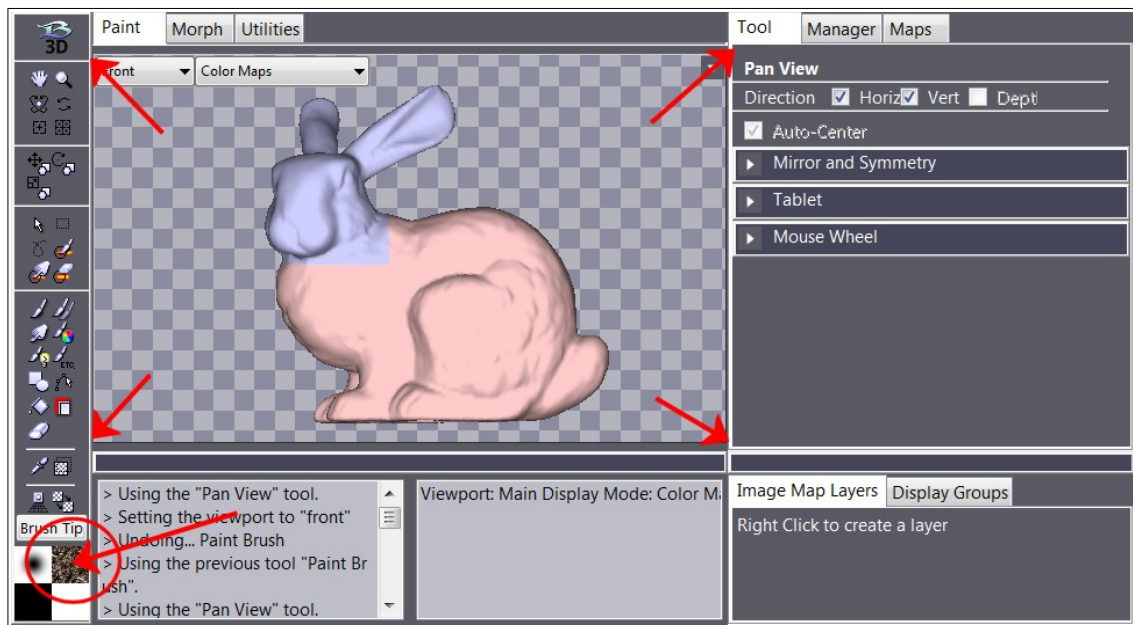
You can also repeat the same procedure using **Per Vertex** or **Per Polygon** hidden surface removal methods. With these types, the visibility of each vertex or polygon determines whether paint should be applied or not. These types depend heavily on the topology of the model, and work best for evenly distributed polygons, and not so well for low resolution ( polygon ) models. The result may also look somewhat jagged, depending on the model in question.



Again, one more time, press **CTRL-Z** to undo the paint stroke, choose **None** as the hidden surface removal method and inspect the results. Notice how the paint went straight through the model. This is very useful for laying down your initial texture which may be consistent through the whole model, even through the back of it.

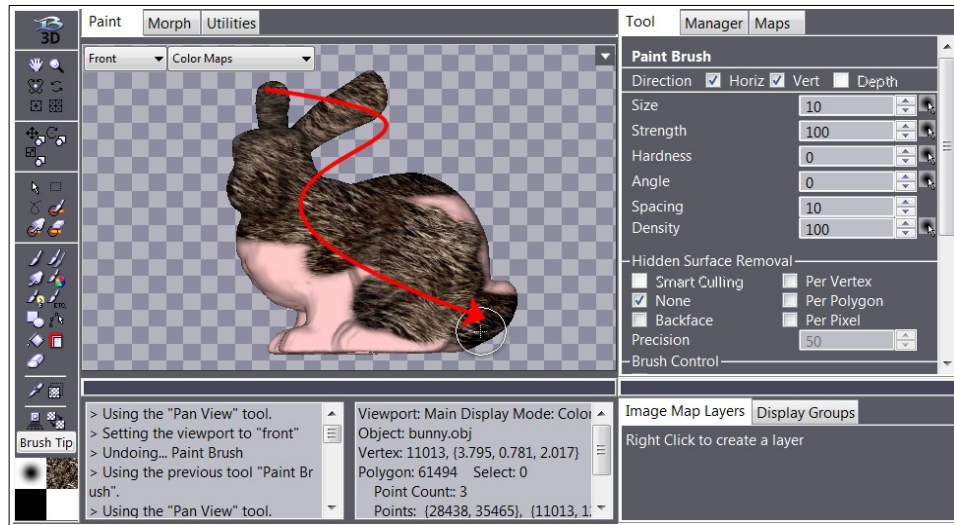


Now that you understand the basic mechanic of using a paint brush in Blacksmith3D, let's do something a bit more interesting. Drag and drop a textured image file into the **Brush Image** box at the bottom-left, making sure that you do not drop it into the **Brush Shape** box, which is beside it.

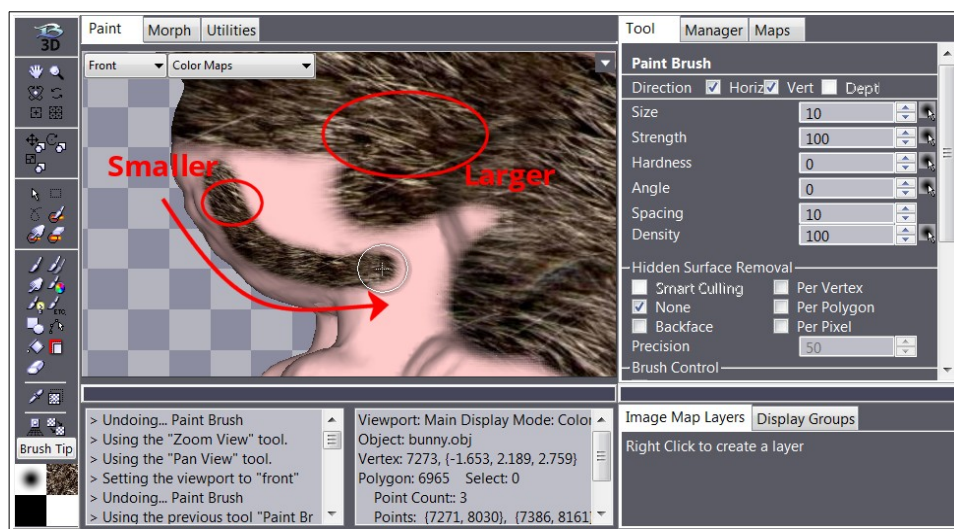


Now, instead of using the **Primary Color** ( which is currently black ), your paint strokes will use this **Brush Image** to texture your brush stroke. The default behavior is to map that image to the plane of the viewport, as indicated by the four red arrows in the viewport above. Let's first do a single paint stroke to illustrate how this works.





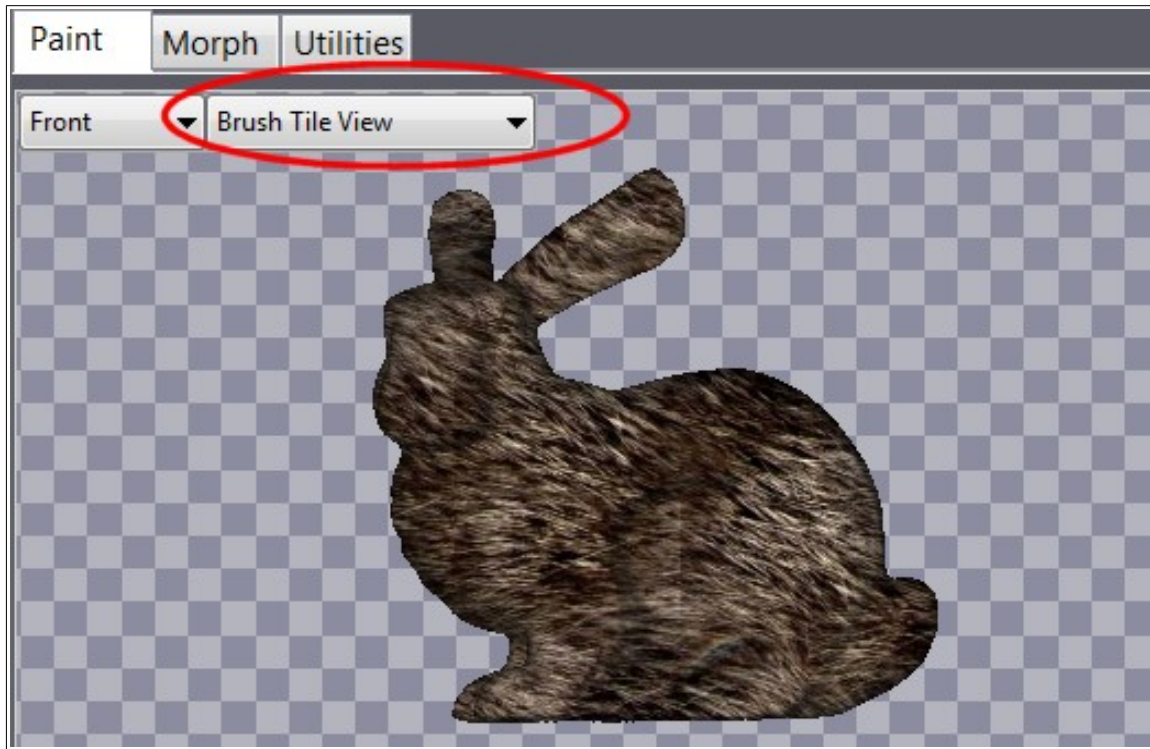
The advantage this method is that the textured brush stroke is always **flat** from your viewing angle, but the disadvantage is that the scale is not consistent. If you zoom in, the textured impression will still be proportional to the viewport, but on a smaller portion of the surface.



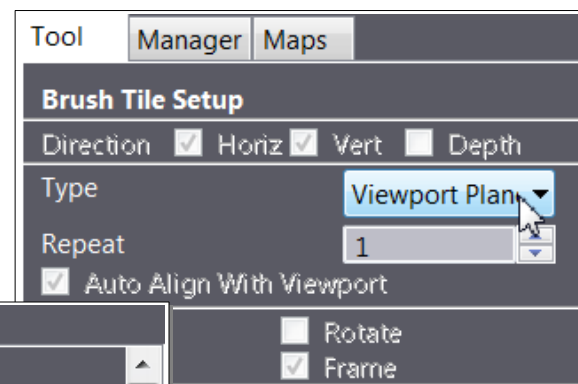
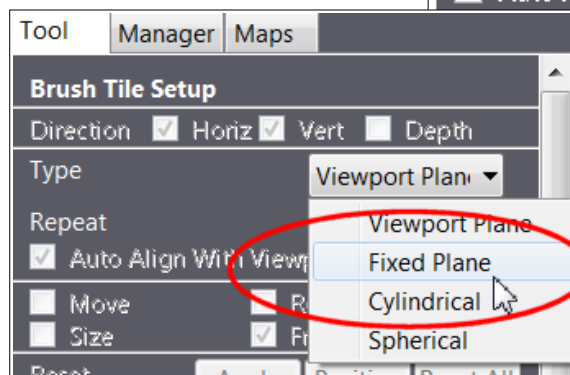
Now, for more advanced wrapping methods, we must look at the **Brush Tile Setup** tool. It allows you to map the brush image to your model in different ways. It is **extremely important to note** that this does not affect your UV mapping in any way. It is a different sort of UV mapping that happens between the viewport, the brush stroke and finally the surface of your model. **The resulting texture will still have the same UV mapping as before.** With that being said, let's get familiar with two hotkeys. First is the **V** hotkey, which triggers the **Brush Tile View** special display mode ( see



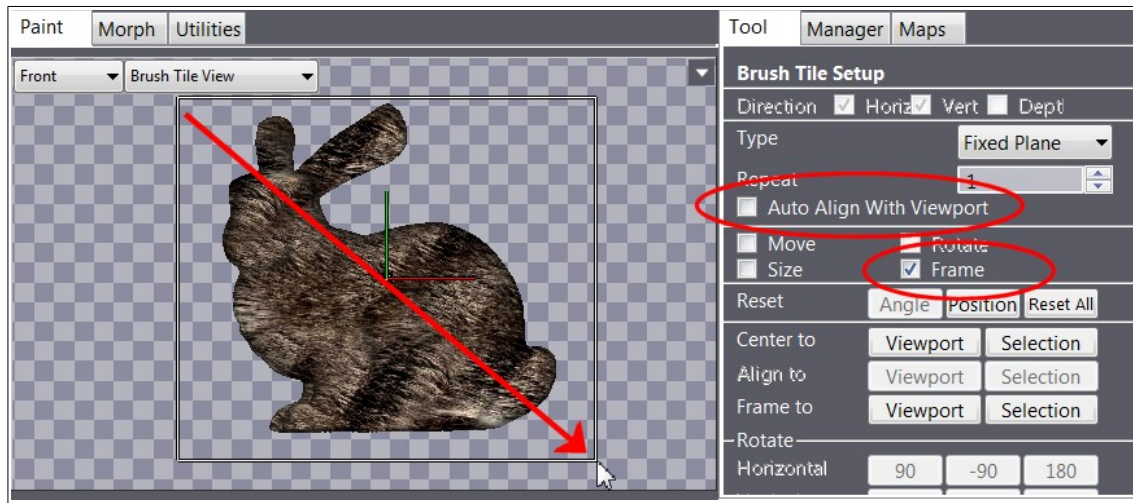
Introduction to Viewport Display Modes ) which allows you to see the **Brush Image** wrapped around the model completely, as if you just painted the whole model with it. Undo the previous paint strokes and then press **V**.



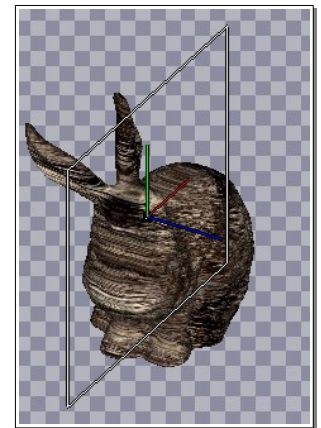
Next, press **SHIFT-V**, which activates the **Brush Tile Setup** tool, which is found in the utilities section. Notice how the **Type** is set to **Viewport Plane** as we discussed before. Next, we are going to change it to **Fixed Plane**, so choose that option from the **Type** drop-down.



Now, in the viewport you may notice a white rectangular frame. If not, don't worry as it may be too small or out of view. Check the **Frame** option, then click and drag in the viewport to define a custom region for the texture to map to. Also, make sure that **Auto Align With Viewport** is not checked. We'll get to that in a moment.

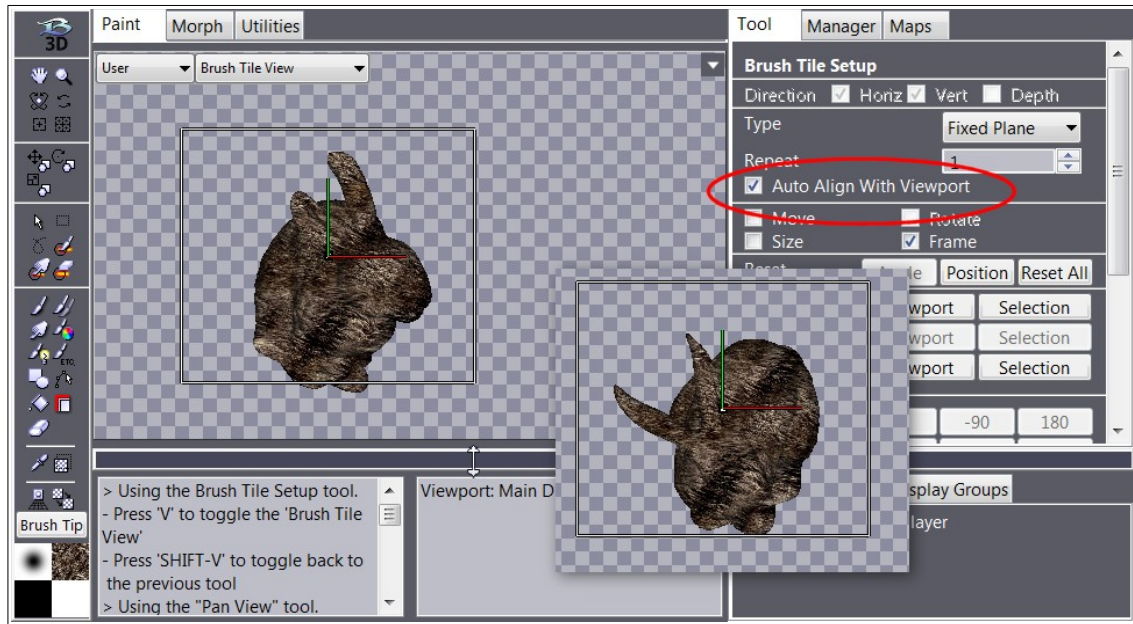


Now notice how the **Brush Image** is stretched within that region. To illustrate the fact that this plane is **Fixed** in space ( and not dependent on the viewport orientation ), press **F3** and rotate the view a few times to see how the brush tiling is truly fixed in space. You can even zoom in and out to see how the scale is consistent.



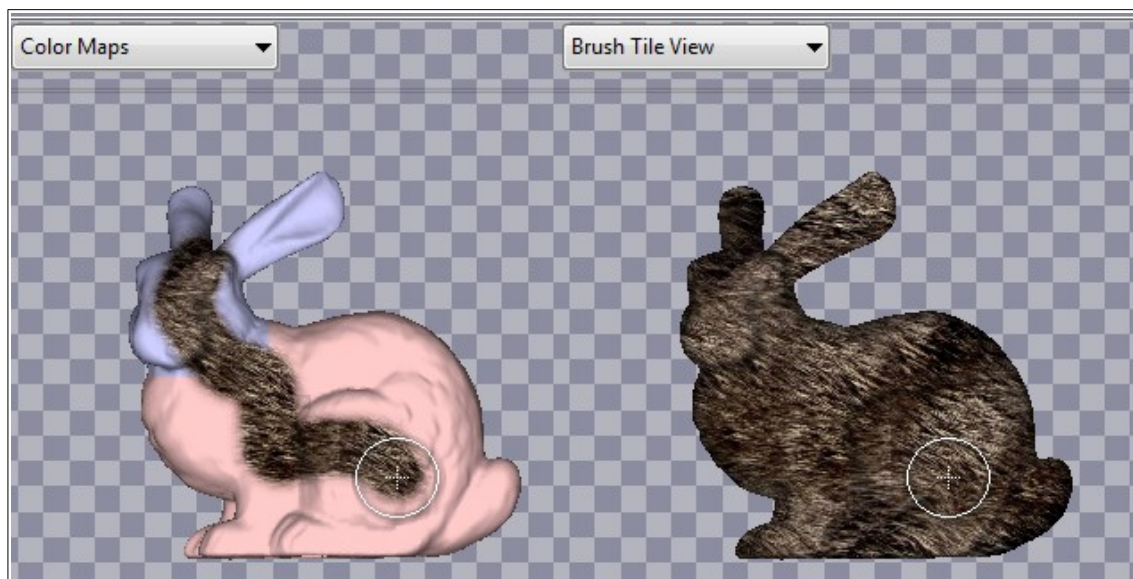
Now, the advantage of this method is that it's consistent as you rotate, zoom and move the view. The disadvantage is the noticeably stretched areas along the side. **This is a side effect of the fact that this is a flat mapping.**

This is where the **Auto Align With Viewport** option comes in. Enable it, and then continue to rotate and zoom in the viewport. Notice how the positioning and the scale of the mapping is still fixed, but the rectangular plane is always facing the viewport.



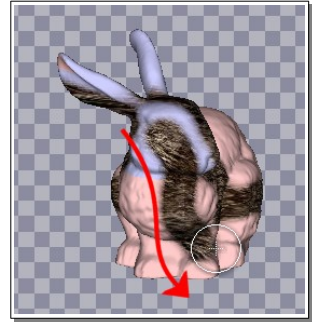
Using this combination of **Fixed Plane** and **Auto Align With Viewport** is extremely powerful, and works especially well with tileable textures.

Now that you understand how the **Brush Tile Setup** works, press the **V** hotkey again to return to the **Color Maps** viewing mode. Notice how the brush tile frame is still visible, but very faint. Now, paint a brush stroke or two, then toggle the **Brush Tile View** again with the **V** hotkey to see how the texture of the paint stroke matches the view.





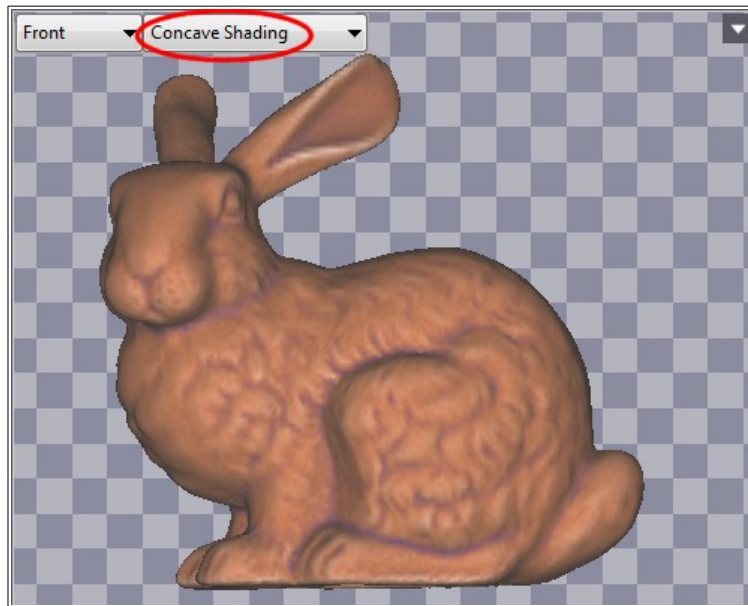
Rotate the the view and apply another brush stroke to really see how the **Auto Align With Viewport** option works. The one thing you may notice is that if you paint close to a falloff edge, the textures will appear stretched when you rotate the view. There is a technique for dealing with this quite eloquently using the **Fade By Angle** which is the topic of another tutorial.



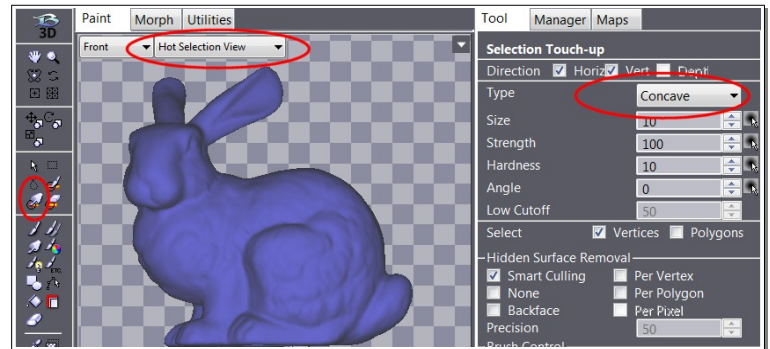
Once you have completed your texture, you can export your texture maps as described in the section **Exporting Textures**. For platform specific exporting considerations, please see **Importing and Exporting**.

## Painting Rough Textures With Concave Geometry

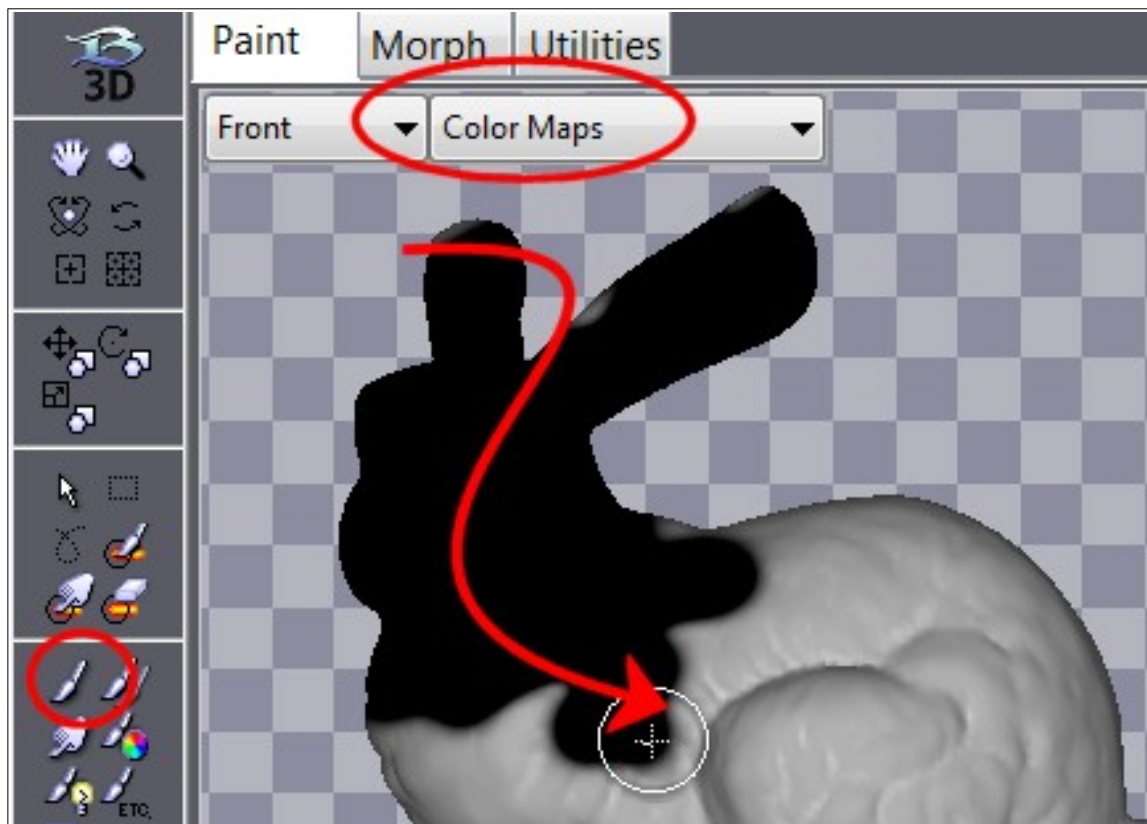
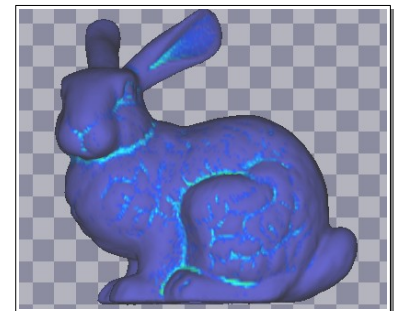
Quite often in 3D graphics, dirty and rough textures make an object look more interesting than solid colors. We often need to have a few tricks up our sleeve to make objects look more realistic through their imperfections. So in this tutorial, we'll show you how to use the new **Concave** mode of the **Selection Touch-up** Tool to create such effects. First of all, load the usual **Textured-Bunny.blacksmith3d** project. By choosing the **Concave Shading** display mode, we can clearly see the rough surface of the model.



Notice how the grooves of the model are shaded a bluish-purple color. This is how we illustrate the **concave** sections of the surface. What we want to do is to paint a darker color, perhaps textured into those areas. With that being said, switch the display mode to **Hot Selection View** and then choose the **Selection Touch-up** brush. Then choose the **Concave** type.



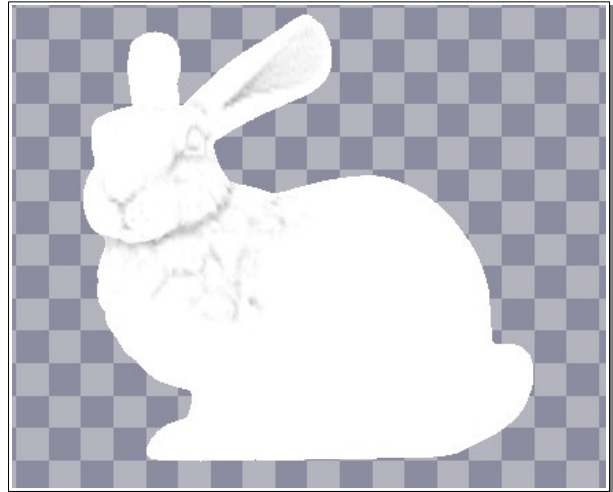
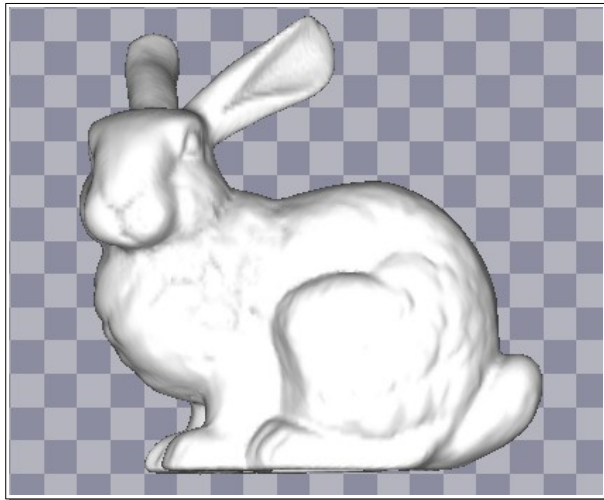
Now, click and drag the brush in the viewport in some of the grooves until it looks something like this image. Notice how the strength of the selection is proportional to how concave the surface is. Now, choose the **Color Maps** display mode, click on the **Paint Brush** and then paint over the selected areas.



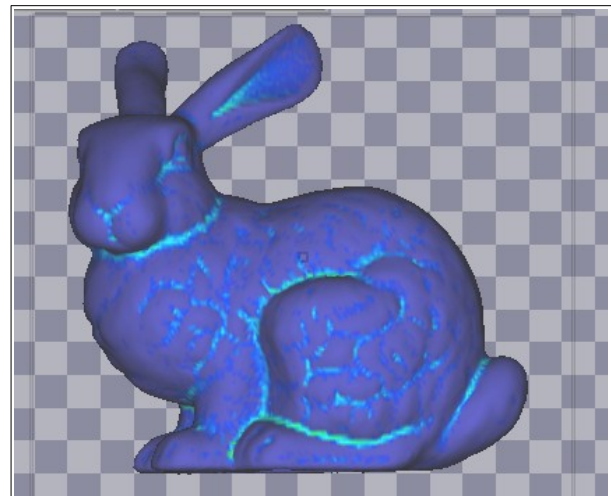
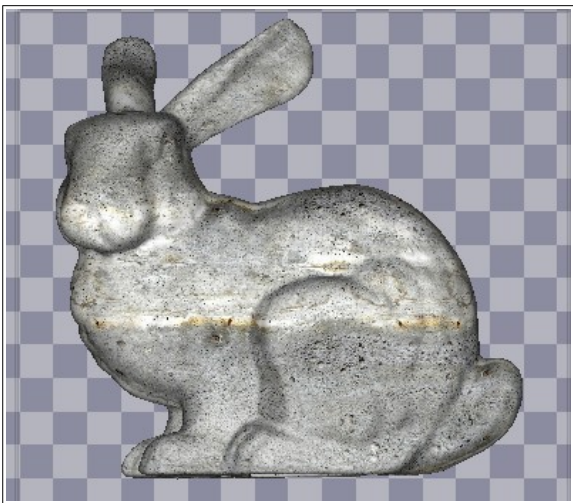


When you release the mouse button, the effect will not be obvious since the darkened color you just painted is being blended in with the darkened surface which represents the unselected area. Press **CTRL-U** to unselect the surface to see the effect.

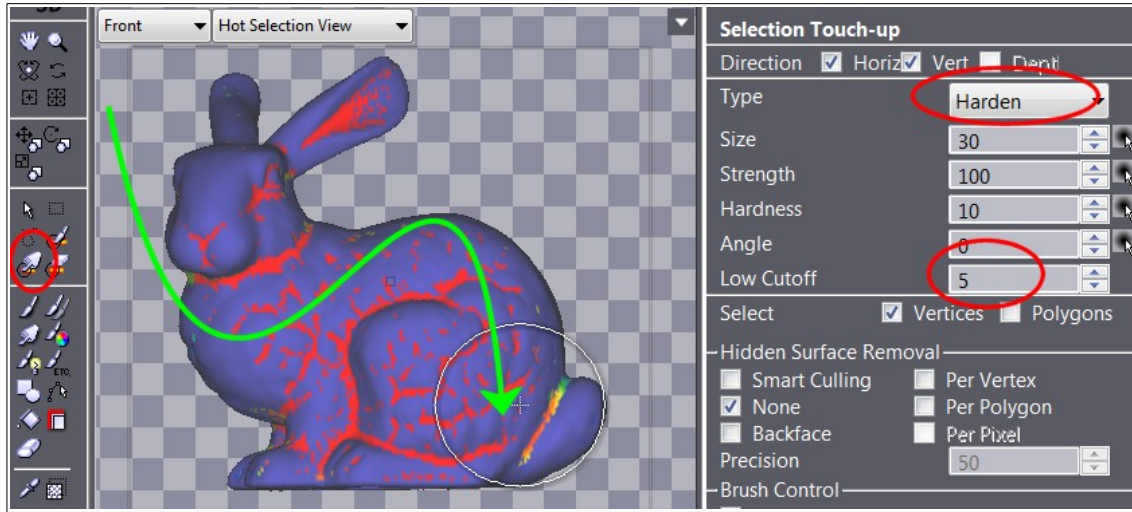
Again, it may not be completely obvious since there are also lighting effects, so let's turn off the lighting by pressing the **G** hotkey.



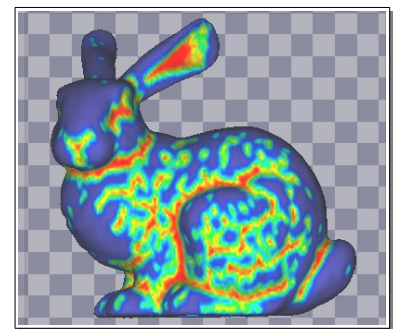
Now you can see how we now made those concave grooves a part of the texture. Now this black and white case is not very interesting, so let's do it again using **Brush Images** ( see **Simple Painting of Texture Maps** for more details on how to set them up ). First, with no selection ( press **CTRL-U** to clear the selection ), we'll paint the whole object with one texture. Then, repeat the procedure for selecting the concave sections with the **Selection Touch-up** tool.



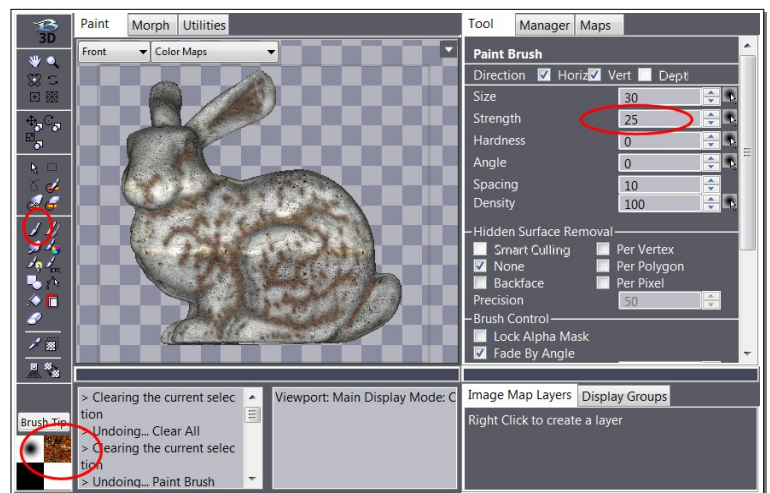
To make the effect more pronounced, first harden the selection by changing the **Type** to **Harden**, changing the **Low Cutoff** to 5%, and then click and drag the brush over the current selection.



Then press the **SHIFT-S** hotkey a few times to soften the selection, such that it only grows the selection ( hence the **SHIFT** modifier ). Then perhaps press the **S** hotkey once without the SHIFT to get what you see in this image.



Now, use a different **Brush Image**, preferably darker and choose the paint brush. In this case, we are going to change the paint brush strength to 25% to make the effect a bit more subtle. Paint over the selected area. Then press **CTRL-U** to unselect the object to see the final result. The “dirty” texture is now emphasizing the grooves of the bunny. This would be a particularly good effect for a statue that has been outside for a long time such that dirt has become stuck in the grooves.



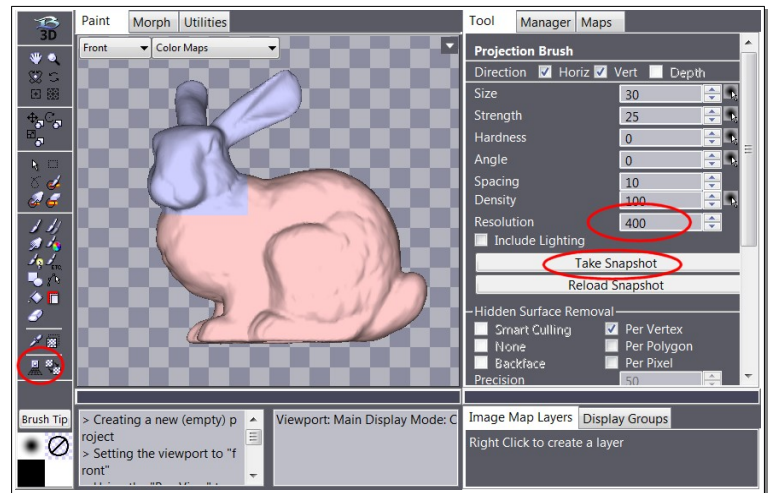
You can also use this same effect to simulate a fake **Ambient Occlusion** by darkening the grooves of an object as if the lighting created subtle shadows.

## Using the Projection Brush

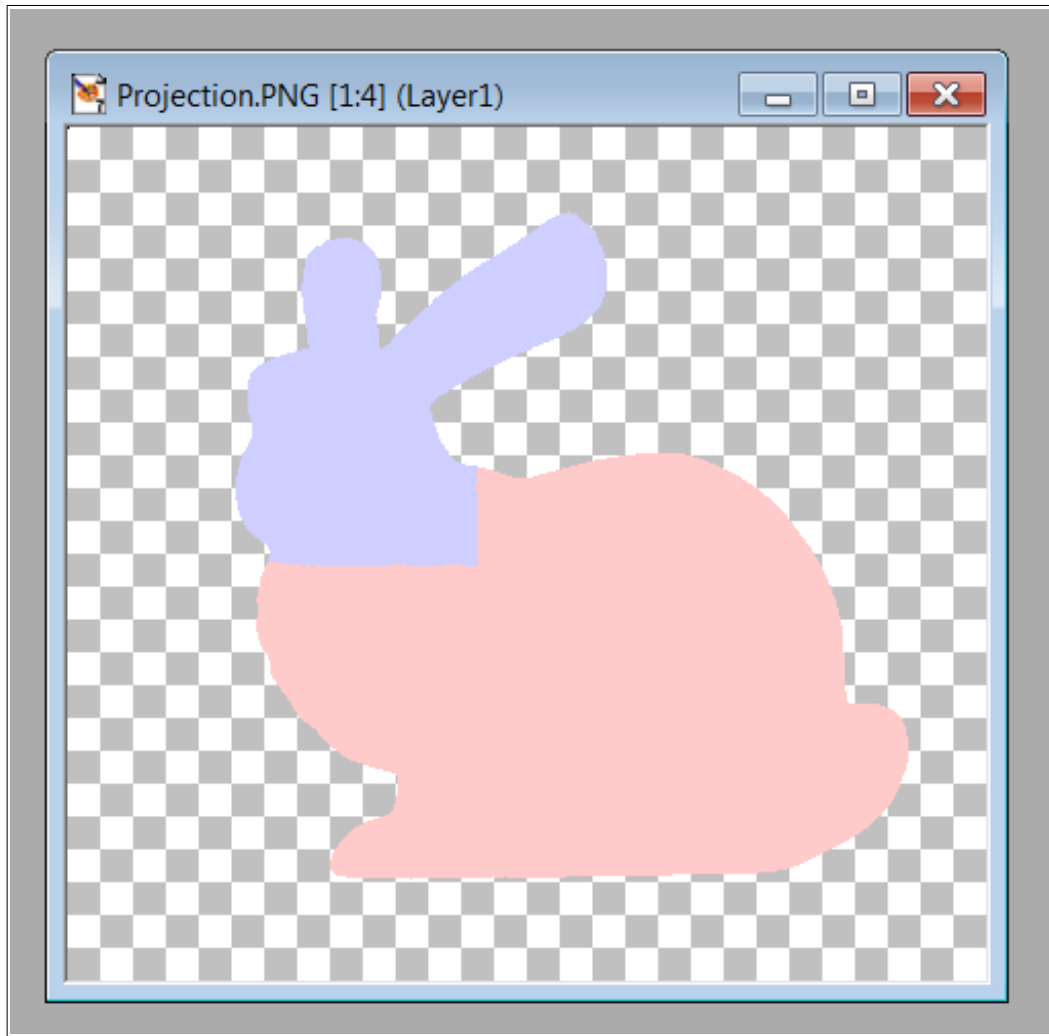
As great as the painting capabilities are inside Blacksmith3D are, there are plenty of features in your favorite 2D painting application that are not present in Blacksmith3D. Wouldn't it be nice if your favorite 2D painting application was capable of painting in 3D, and painted across UV seams and multiple maps as well as Blacksmith3D? Well, you are in luck! Using Blacksmith3D's projection brush, you can use just about any 2D painting application to paint in true 3D. The procedure goes like this...

- Setup your B3D viewport to a perspective that you would like to paint.
- Choose the projection brush and export a snapshot as a PNG.
- Edit that snapshot in your favorite 2D painting application.
- Reload the snapshot in Blacksmith3D.
- Paint the results back onto the surface.

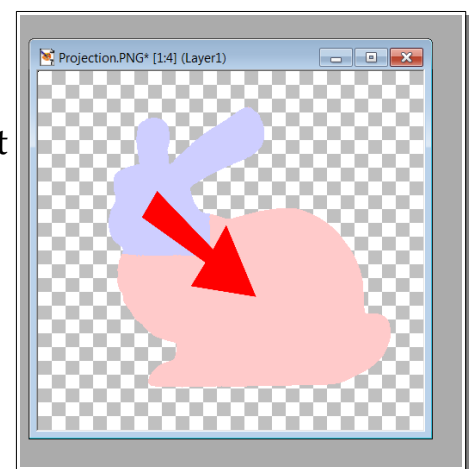
Now, let's go through a round trip to show you how it's done. To emphasize that we can paint across multiple maps, load in the **Textured-Bunny-Multi.blacksmith3d** file. Then choose the **Projection Brush**, set the resolution parameter to 400%. Then click on the **Take Snapshot** button to export a PNG file, which will be 4x the size of the viewport ( hence Resolution = 400% ).



You can save the file anywhere, but since it is temporary in nature, you may want to save it on the desktop for easy access. Load that file into your favorite 2D painting application.



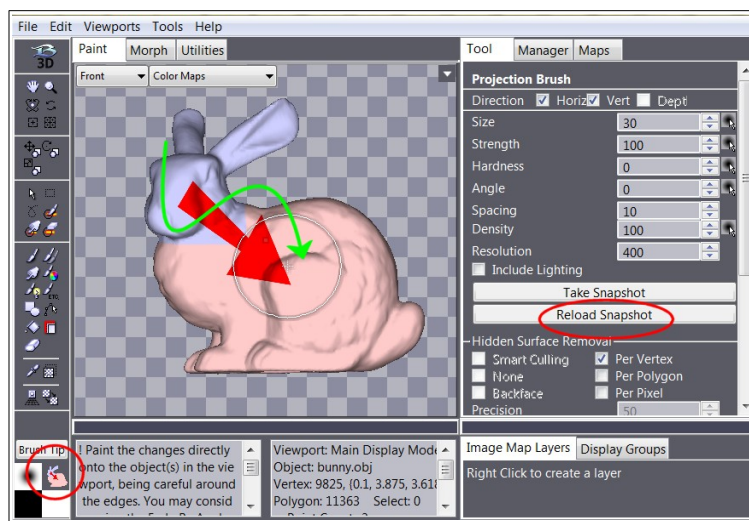
Notice how there is no lighting applied by default. If you do want to have lighting included, you could have checked the **Include Lighting** option, we'll talk about that later. Now, paint something across the snapshot as if you were painting in the 3D viewport. In this example, we'll be sure to paint across the two separate maps just to emphasize that it can be done with ease. Here we will paint a simple shape. At this point you can paint as much or as little detail as you wish, but try not to paint too much near the edges, as they may get stretched from the planar mapping ( as discussed in **Simple Painting of Texture Maps** ).





Now, **save over the original Projection.PNG file** ( yes, save over it, there's a good reason for that ), go back to Blacksmith3D and click on **Reload Snapshot** and locate the Projection.png file. Notice how the projection has now been loaded as **Brush Image**.

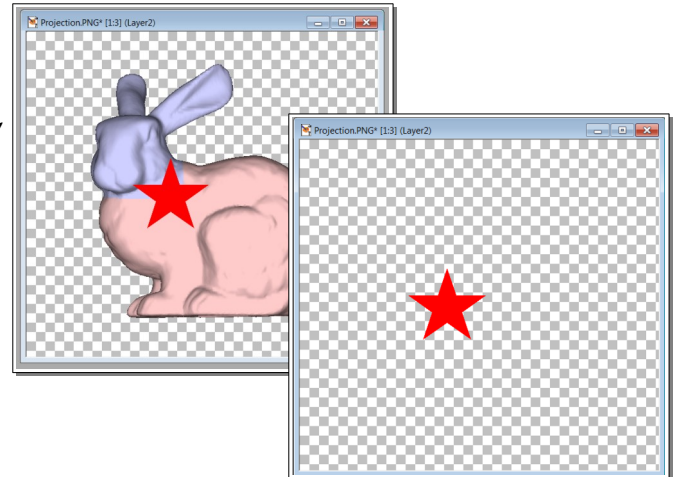
Now, simply click and drag in the viewport to paint the changes onto the surface of the model. You may want to avoid the edges, or enable the **Fade By Angle** option ( which is the topic of another tutorial ) to prevent stretching on the sides.



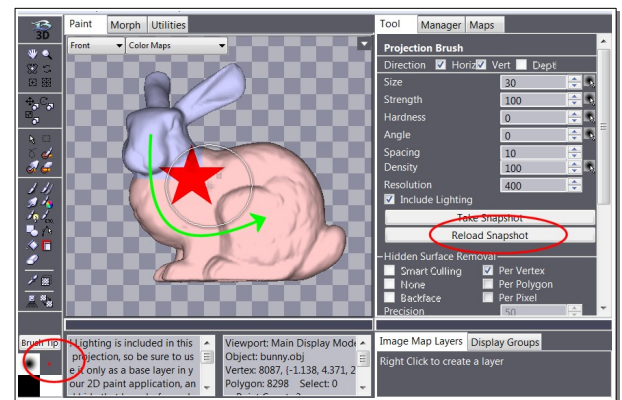
This is the simple technique, but when you already have a detailed texture on the surface, you may lose some of its detail due to the resolution loss, even if the **Resolution** value is relatively high. Also, you may want to include lighting in the snapshot, but not have that lighting appear in the final result. To account for these factors, you should **create a new layer in your 2D painting application**, and hide the base layer before resaving the PNG file. This way, only the **changes** you made to the texture will appear in the final brush stroke. So, undo the paint stroke in Blacksmith3D, check the **Include Lighting** option and repeat the procedure...



Create a new layer inside your 2D painting application and paint on it instead of the base layer. When you are done, **hide the base layer**, and then save over the Projection.PNG file so only the new stuff appears in the file. Notice how everything around the newly painted shape is transparent, i.e. alpha = 0. This is very important for transferring the texture back into Blacksmith3D.



As we did before, click on **Reload Snapshot** and paint the changes back onto the surface of the model. Notice how the small **Brush Image** icon at the bottom-left only shows the star, and not the complete object.



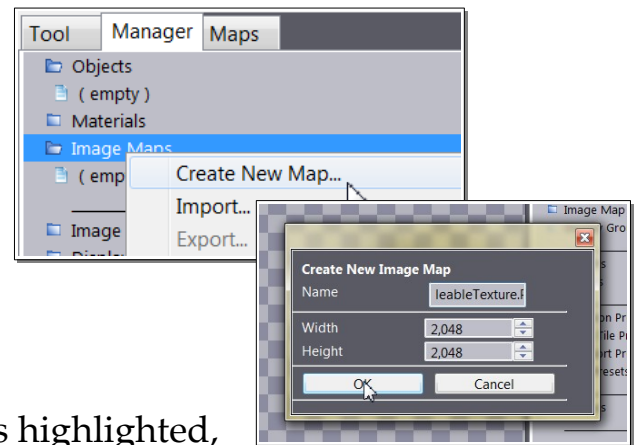
You are required to take the extra steps of creating the new layer, and then hiding it before re-saving the file, but it's well worth it so the underlying texture does not get blurry. Also, including the lighting makes the projection appear to be a 3D viewport in the 2D painting application, so it's well worth the two extra steps.

As a technical note, you will notice a file being created next to the **Projection.PNG** file called **Projection.projectionInfo**. This file contains information about the state of the 3D viewport, so if you accidentally change the viewport orientation, resize the window, etc., it will still be able to setup the proper projection. Otherwise, the projection that you painted on may not match up with the current projection, resulting in unexpected results.

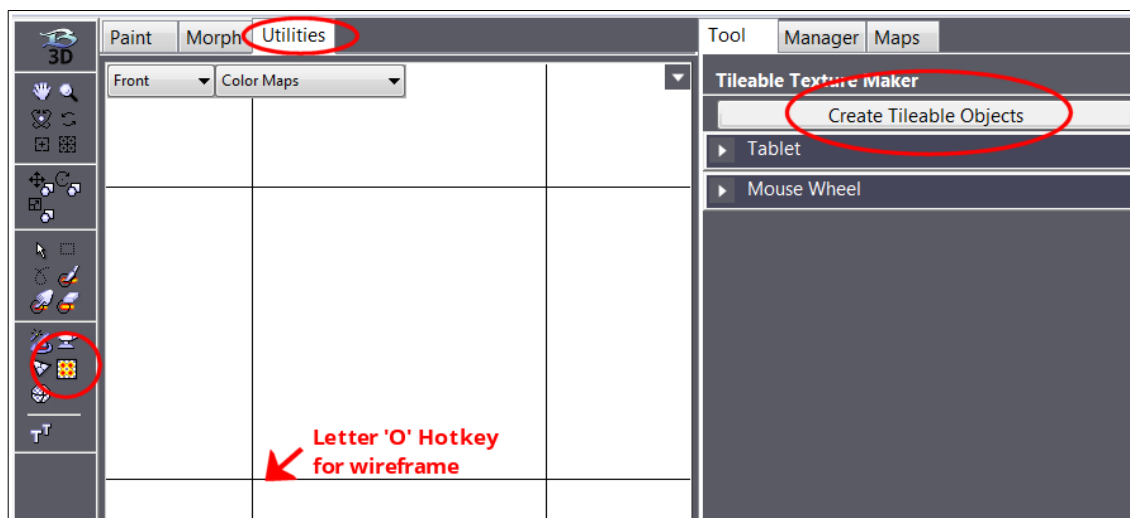
## Creating Tileable Textures

Blacksmith3D offers a **Tileable Texture Maker** in the **Utilities** tab. It's power is in it's simplicity. It simply generates a 3x3 grid of rectangular objects with the same texture applied to each of them. Once setup, you simply paint on the middle tile, allowing the paint strokes to overlap with the outer tiles. The resulting texture will have a repeating pattern with no obvious edges. There is however a fine art to making the texture repeat in a way that is not so obvious, and we will attempt to show a how to do this.

First, we will create a blank texture by clicking on the **Manager** tab, right clicking on the **Image Maps** folder, and choosing **Create New Map...** . Then, choose a name like **MyTileableTexture.PNG**, specifying the dimensions, and then clicking **OK**.

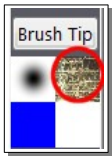


Making sure that the newly created image map is highlighted, click on the **Utilities** tab and click **Tileable Texture Maker**. Then click on **Create Tileable Objects**. Then, click on the **O** hotkey to display the wireframe overlay, so you can clearly see the tile in the center.



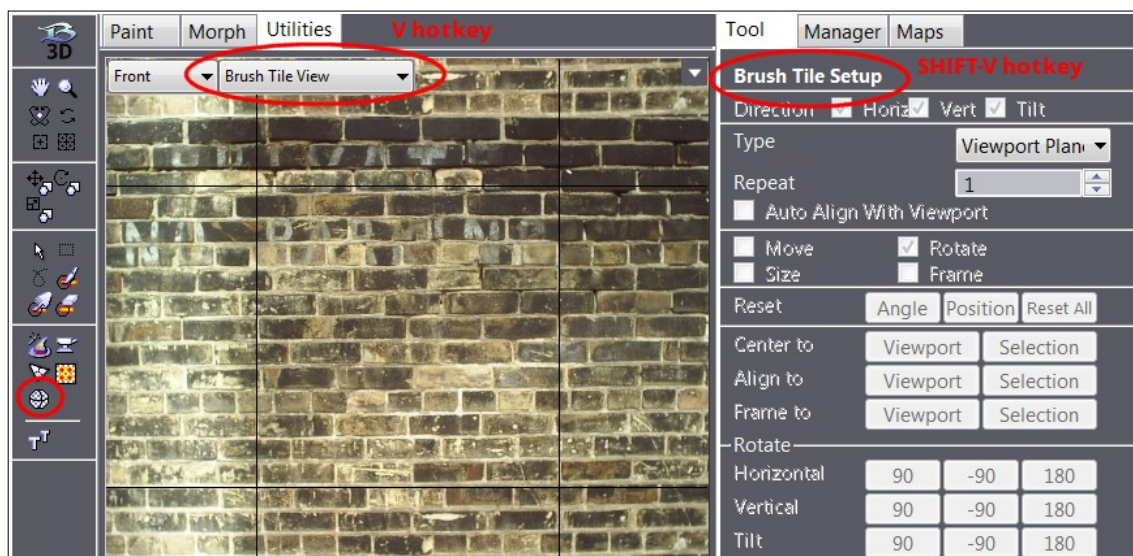
Now, load in a **Brush Image** that currently is NOT tileable ( repeating texture ) that we would like to make a repeating version of. For this example, we'll use an image found in the Blacksmith3D installation in the subfolder

..\Images\05-Rocks-and-Masonry\Rocks-and-Masonry-0005.jpg

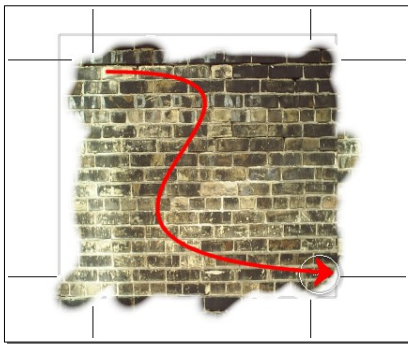
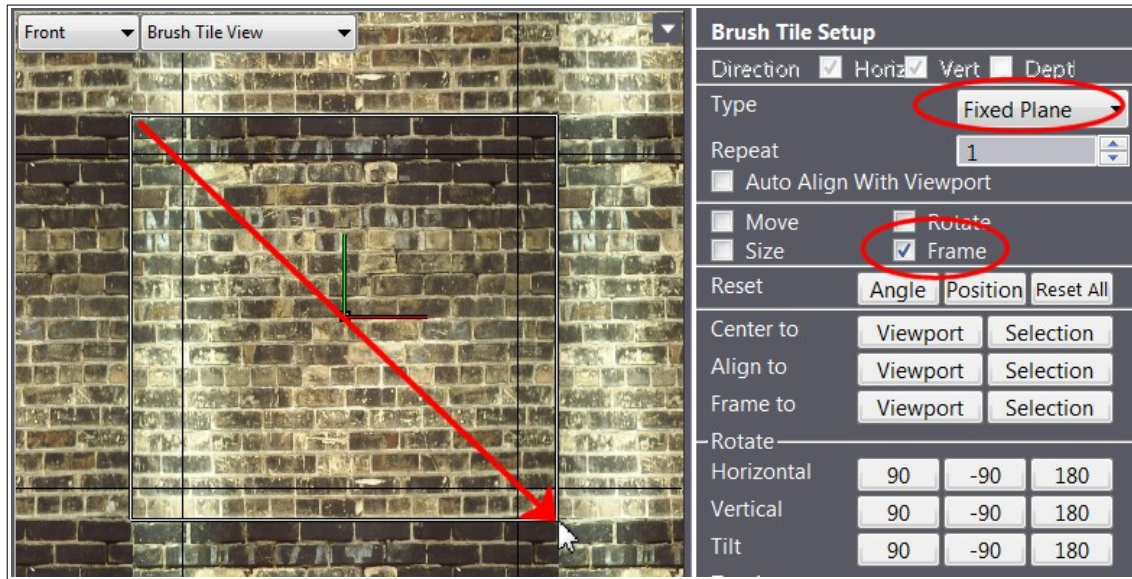


Drag and drop the image into the **Brush Image** box at the bottom-left corner of the interface, making sure you don't drop it in the **Brush Shape** box immediately next to it.

Now, press the **SHIFT-V** hotkey to enable the **Brush Tile Setup** tool ( also found in the utilities tab ) and press the **V** hotkey to enable the **Brush Tile View**, so you can see how the brush image will be projected onto the surface with each brush stroke.



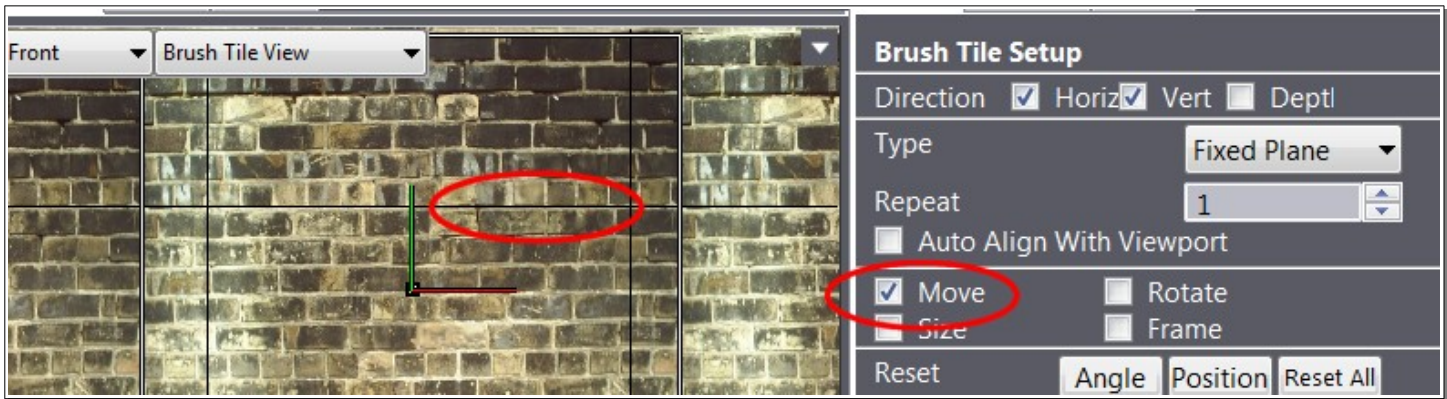
Next, choose the **Fixed Plane** type, check the **Frame** option, and then click and drag a box that is slightly bigger than the wireframe for the center tile. It is **very, very important that the framed brush tile image completely enclose the inner tile**, or an obvious seam will appear in the resulting texture.



Now, choose the paint brush, and paint over the entire inner tile. When you release the mouse button, you'll notice that the surrounding tile are filled with the texture as well, since they are sharing the same texture as the center tile. At this point, the texture may actually be *tileable*, however, we must do a bit more work to make it a **good tileable texture**.

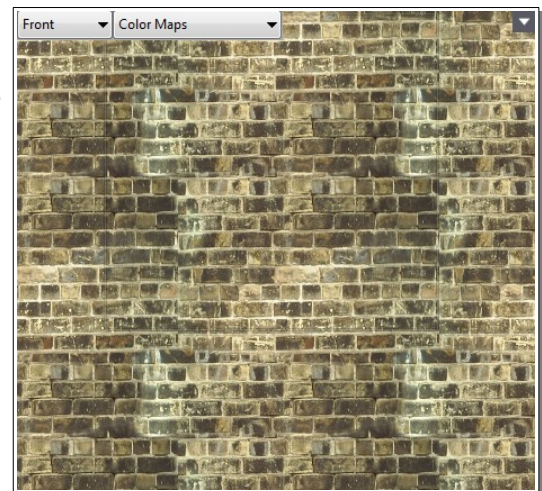


The first thing you may notice is that there is a darker portion at the top and bottom of the texture, and this may make the repeating pattern a bit too obvious. To eliminate this, we will press **SHIFT-V** and the **V** again, choose **Move**, and then click and drag up in the viewport until the top portion of the center tile is covered in the lighter portion of the texture. Press **V** a few times to toggle back and forth, and line up the bricks so the resulting texture will be consistent.



Now, paint a few brush strokes, focusing only on the top edge, and not the bottom edge of the center tile. Notice how the dark band in the texture is now being replaced with the lighter portion, while maintaining consistency throughout.

Press the letter **O** hotkey to turn off the wireframe, so you can see how the texture repeats seamlessly.





## Morphing

The morphing features in Blacksmith3D were designed for morphing moderate to high resolution models, in the 10,000 – 100,000 polygon range, although this is just a general rule of thumb. Low resolution models are often best morphed on a per vertex basis in a modeling application, while higher resolution models require advanced methods of using “soft selections” to organically morph a large number of vertices in a single operation. In Blacksmith3D, this is achieved in two ways...

Using **hammers**, you first create a selection using any of the selection tools, optionally soften it with the “S” hotkey, and then use the hammer tool to deform the selected area. You then repeat this procedure until you achieve the desired shape.

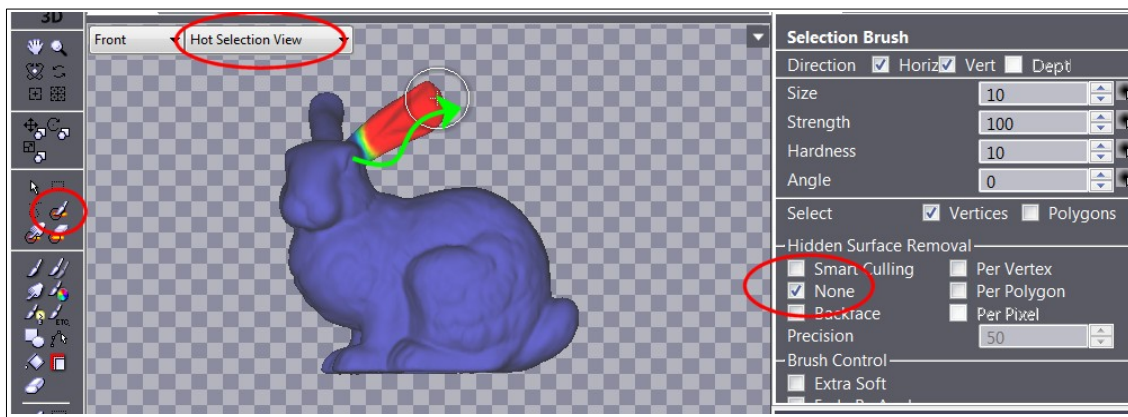
Using **chisels**, the tool behaves like a brush and you can deform the surface as you click and drag across the surface of the model. You may optionally use a selection to mask, or stencil, the desired surface so it only affects the selected area.

In most projects, you'll find yourself using a combination of both, depending on your needs. The following tutorials will show you how to use both the chisels and the hammers to achieve a variety of tasks.

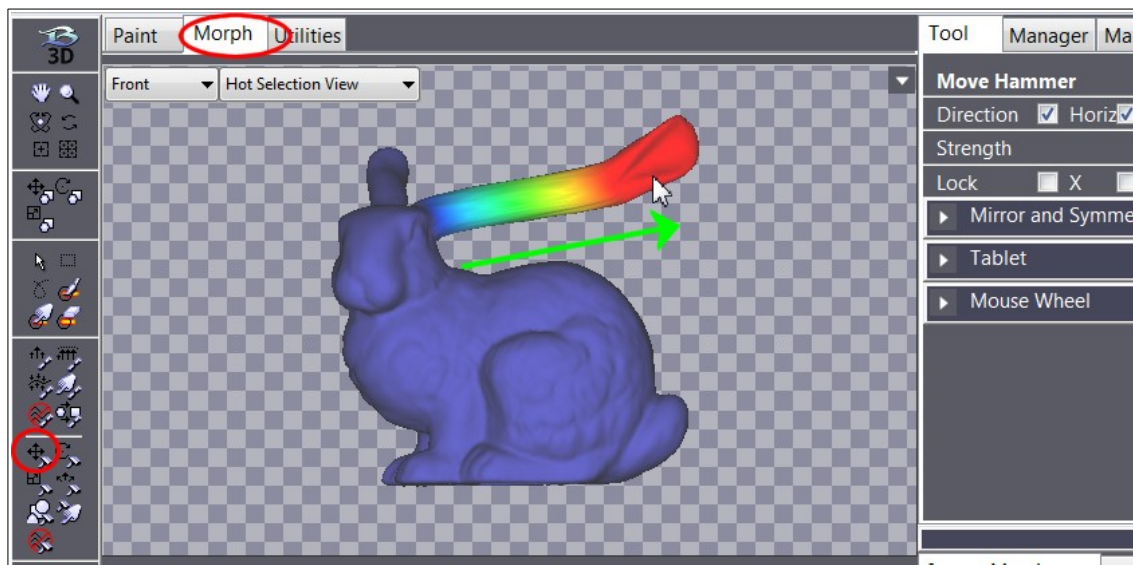
## Basic Usage of Hammer Deformers

**Hammer** deformers have a two step process for creating deformations; Select and Deform. You can then repeat the procedure as many times as necessary until you achieve the desired results. Let's load in our familiar **Textured-Bunny.blacksmith3d** project and go through the most common hammer deformations.

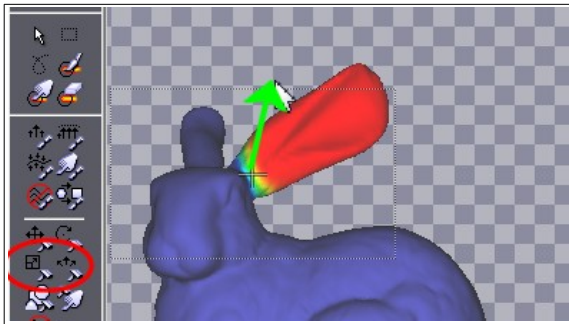
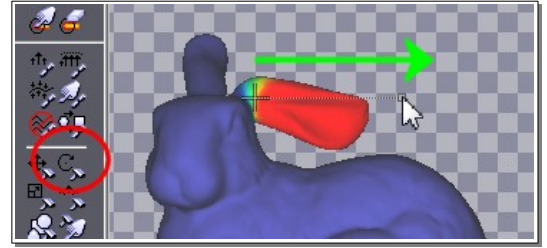
First, choose the **Selection Brush**, and choose **None** as the Hidden Surface Removal method. Then paint a selection over one of the ears as illustrated here. It is also helpful to use the **Hot Selection View** display mode so the selection is always visible. You can also press the **S** hotkey a few times to soften the resulting selection.



Now that we have made a selection, we can choose from any one of the hammers to deform it. Let's start off with the **Move Hammer** and see how it deforms the selection by clicking and dragging in the viewport. Press CTRL-Z to undo the deformation after you have seen how it works.



Now, choose the **Rotate Hammer**, click at the base of the ear, and drag in the viewport. Notice how the point you click on determines the center of rotation. Again, press CTRL-Z to undo the deformation so we can try another.



Choose the **Scale Hammer** and click at the base of the ear and drag. Notice again how the point you clicked on determines the center of the scaling.

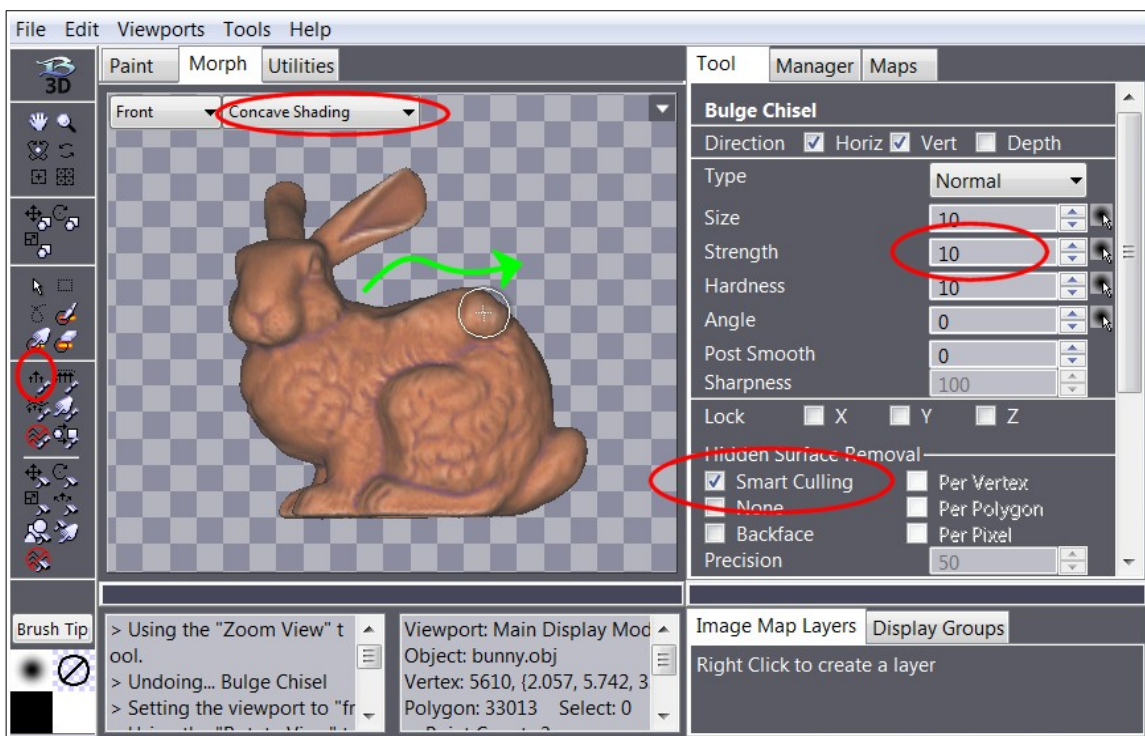
The other hammers have the same work flow and we invite you to give them a try. You can read about their individual functionality in the **Morph Tools** section.

## Basic Usage of Chisel Deformers

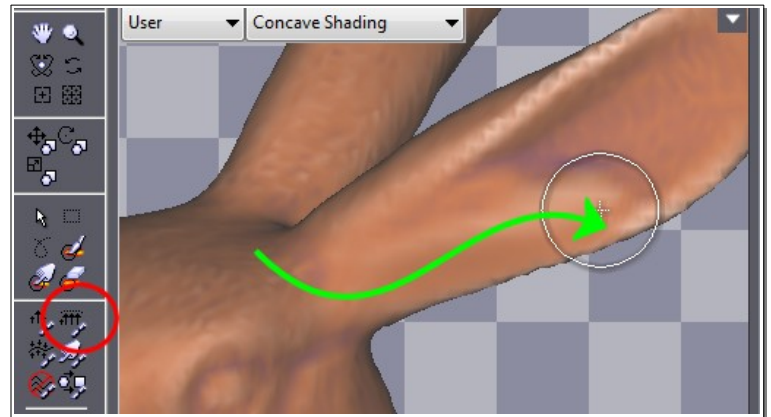
Chisels are deformers that act like Brushes, meaning you can “paint” the deformations instead of having to do the two step process as used with Hammers. As with paint brushes, you do not have to create a selection and it follows the same work flow. If there is no selection, then the chisel can act on everything ( within the brush stroke ). If there is a selection, then the chisel can only act on the selection, and the strength of it's effect is proportional to the strength of the selection. So, let's get started using our familiar **Textured-Bunny.blacksmith3d** project.

Load the project and choose the **Concave Shading** display mode since it is very helpful for visualizing subtle deformations. Then choose the **Bulge Chisel** and set the **Strength** to 10%.

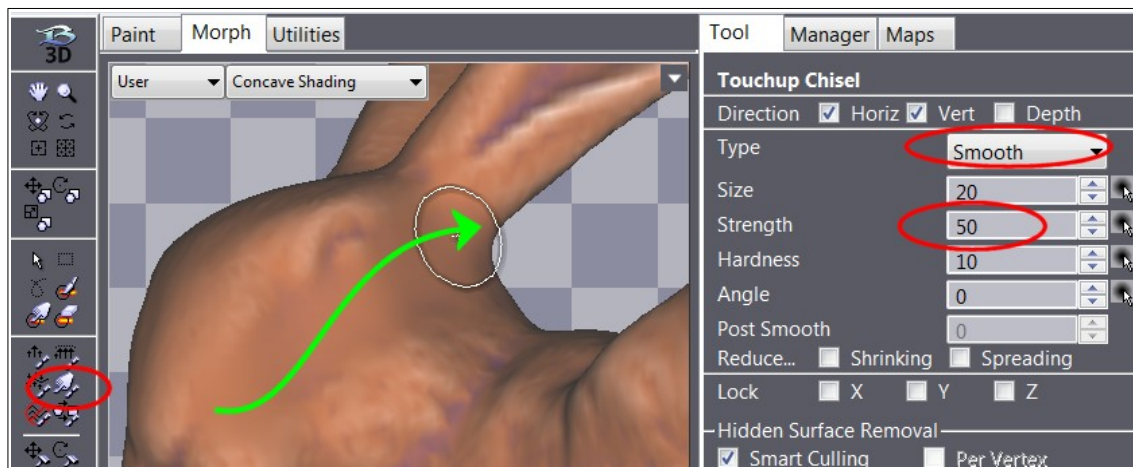
Please make sure that **Smart Culling** is enabled as it works best with chisels, and you should always use it unless you have a good reason not to. Click and drag in the viewport across the surface of the model and notice how the bulging effect slowly builds up. This is why we set the strength to 10%. If the strength is too large, it can be very difficult to achieve natural effects. It's best to build it up with multiple passes.



Next, we will use the **Resurface Chisel**, which will help you fill in concave sections. If you were working with clay, it would be like filling the hole with clay and flattening it out. Zoom in on the ear section and click and drag in the viewport with the **Resurface Chisel** to see how it works. Press CTRL-Z to undo when you are done.

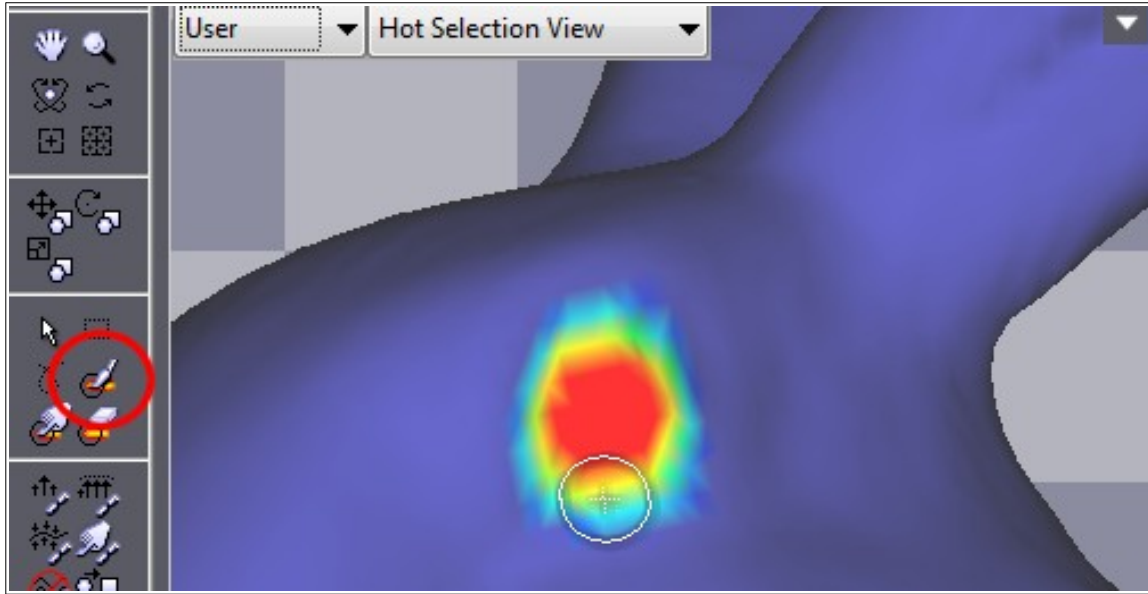


To smooth out details in the surface, and other touch-up effects, use the **Touchup Chisel**. Setting the **Type** to **Smooth**, click and drag on rough spots on the surface to see it smoothing them out. Depending on how much you want to smooth it, you may consider increasing the **Strength** value, or keep it low and use multiple passes.

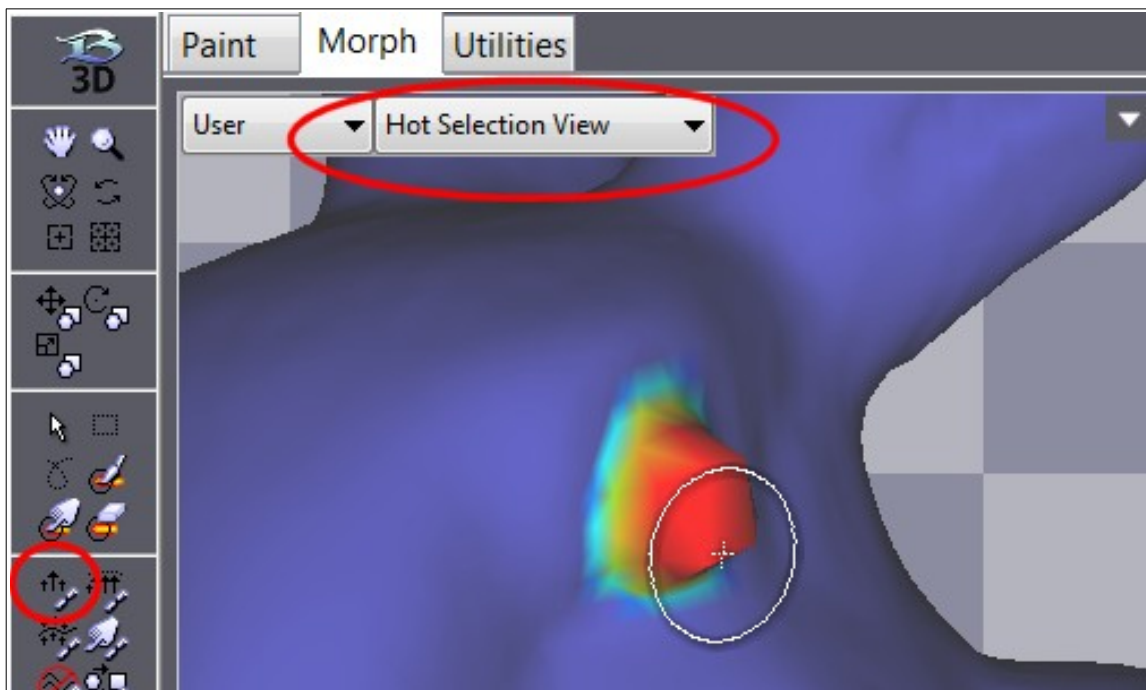




Now, as we alluded to before, you can use selection to isolate a portion of the surface for editing. Use the **Selection Brush** to select the eye of the bunny as shown here. Press the **S** hotkey to soften it once.

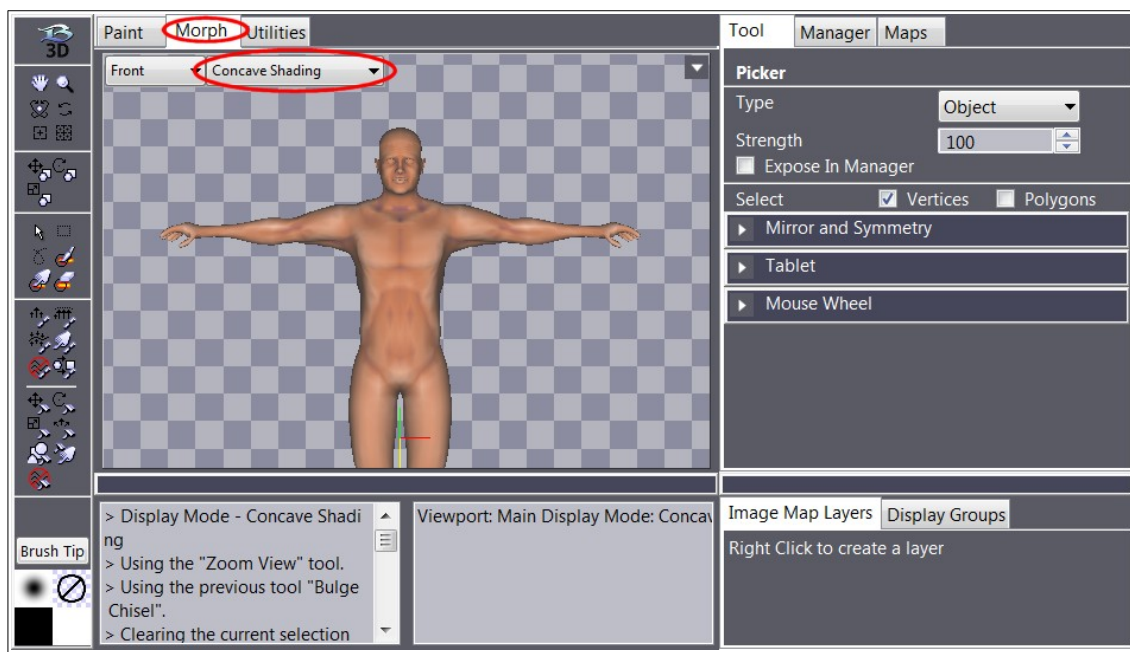


Now, choose the **Bulge Chisel** again, set the strength back to 10%, and click and drag over the eye. Notice how only the eye gets deformed, and the soft selection around the edges results in a smooth transition.



## Deforming With Symmetry

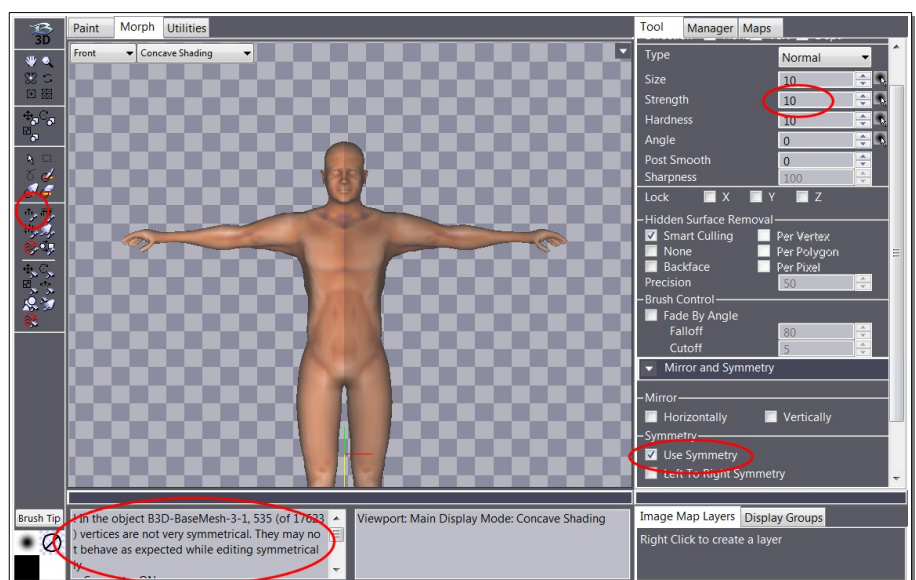
In this tutorial, we are going to show you how to morph objects in a symmetric way, and address a few of the issues involved. First of all, load the project **MorphedMan.Blacksmith3D**. Click on the **Morph** tab to expose the morphing tools. Because we are going to be morphing, it is useful to view the object with the **Concave Shading** display mode.



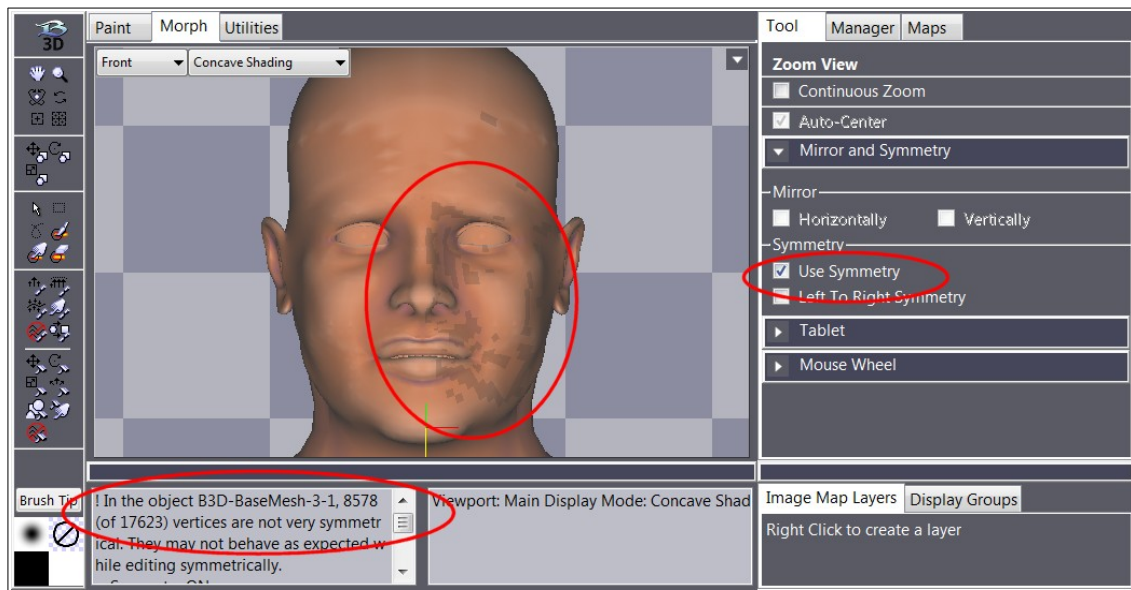
Now, choose the **Bulge Chisel**, set the strength to **10%**. Expand the **Mirror and Symmetry** box and then enable **Use Symmetry**. You will see a warning message in the message box saying that not all of the vertices are symmetrical.

If the number of non-symmetrical vertices is relatively low, then it's usually not much of an issue.

However, if this number is relatively high, then there is a problem and symmetric operations will not behave as you expect.

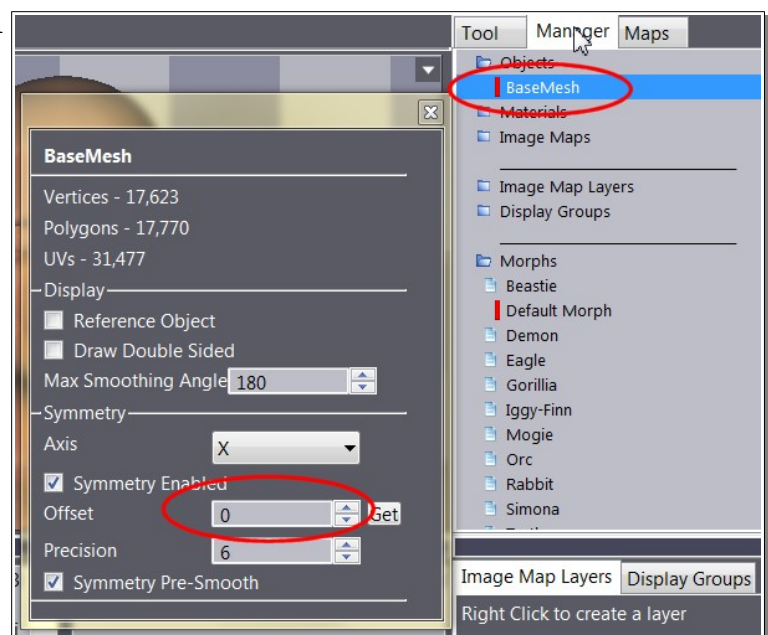


We can see in this example how one side of the model is shaded dark while the other is lighter. This is an indication of **good symmetry**. To see what an object with bad ( but correctable ) symmetry looks like, load in the project **MorphedMan-Bad-Symmetry.blacksmith3d**.



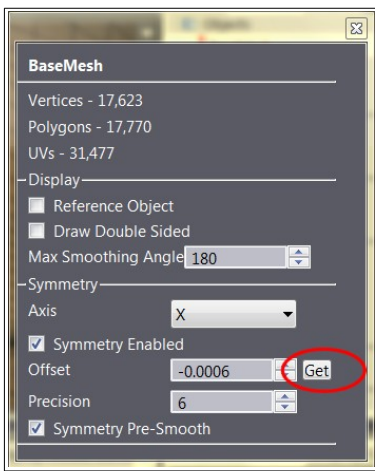
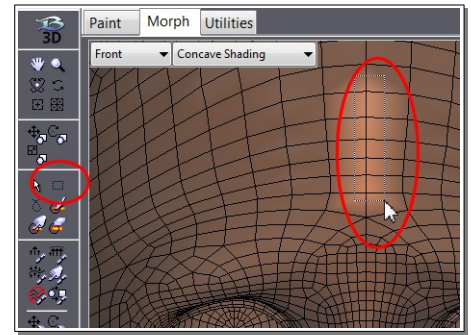
The message at the bottom indicates that 8578 of 17623 of the vertices are not very symmetrical. You can also see that there are dark shaded patches on the model. In this case, the problem is that the whole object is slightly off center, and hence confusing the symmetrical calculations. To correct for this, click on **Manager**, then expand the **Objects** folder and then double-click on the object **BaseMesh**.

In the pop-up window, there is a section called **Symmetry**. In that section, there is an option for **Offset**, and that is what we are interested in. This will allow us to define a slight offset to account for this object not being perfectly centered. Now, the exact value of that number may not be so obvious. Fortunately we do have a technique for getting it automatically.



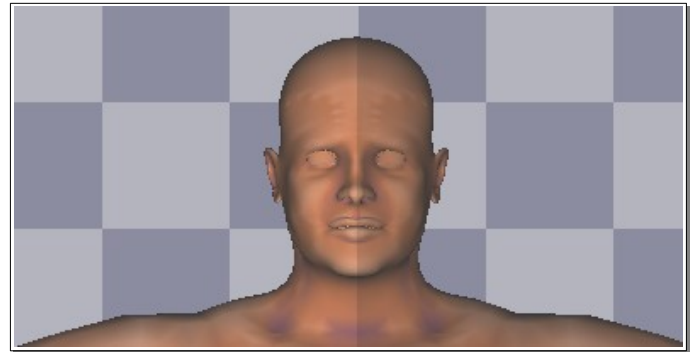


To obtain correct value for offset ( for this particular model ), choose the rectangular selection brush, press the **O** hotkey ( to view a wireframe overlay ), and select a few vertices along the center line of the object. Be sure to only select vertices along the center line. If any other vertices are selected, it will result in bad symmetry.

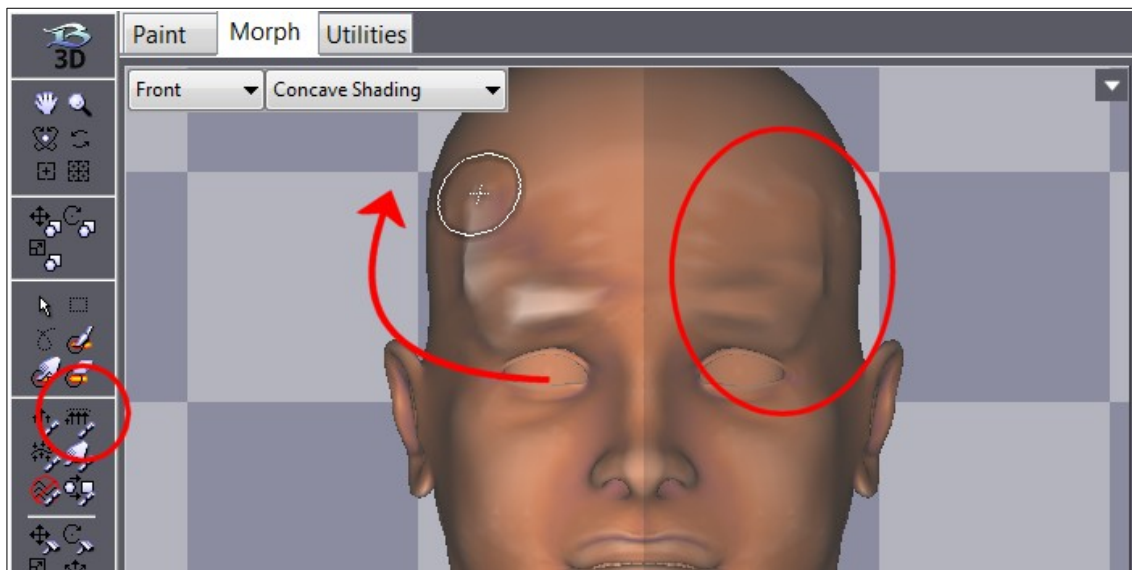


Going back to the **Object Properties** window, click on the **Get** button next to offset to get the value of the offset from the selected vertices. Notice how the value of offset ( in this case ) is now -0.0006 and one half of the object is now shaded darker than the other. This means that the symmetry features will now work properly. Press the **O** hotkey again to

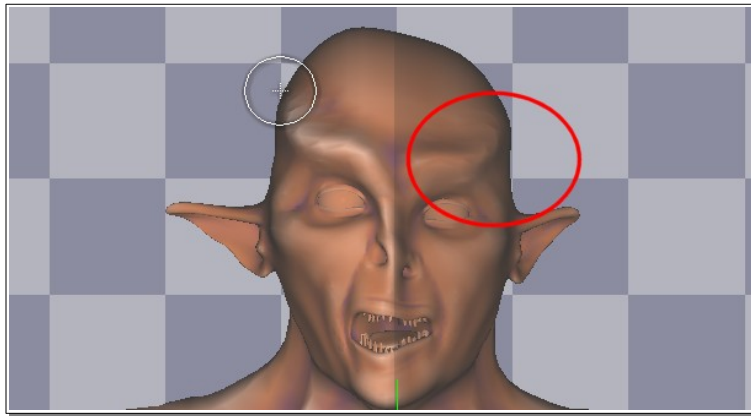
remove the wireframe overlay.



Now, using our **Bulge Chisel** ( with strength set to 10% ), click and drag on the light side of the model, and observe how the deformation is mirrored onto the other side as well.

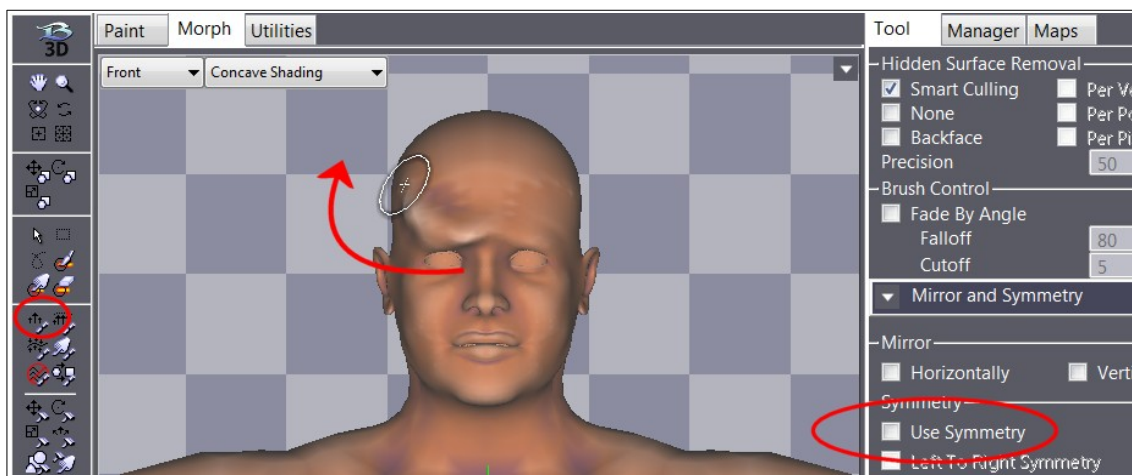


All of the deformers will use symmetry in this way. It is important to note that can turn the symmetry on or off at any time. The symmetry uses the **base vertices** to determine of the symmetric vertices are matched up. So if you deform a model asymmetrically, it will still “remember” how the symmetric vertices match up. This is only true if the **combination of morph targets is asymmetrical** while the base object is **symmetrical**. If you export the asymmetric result as an OBJ and re-import it back in, all of the symmetric information will be lost, and symmetry will not work properly.



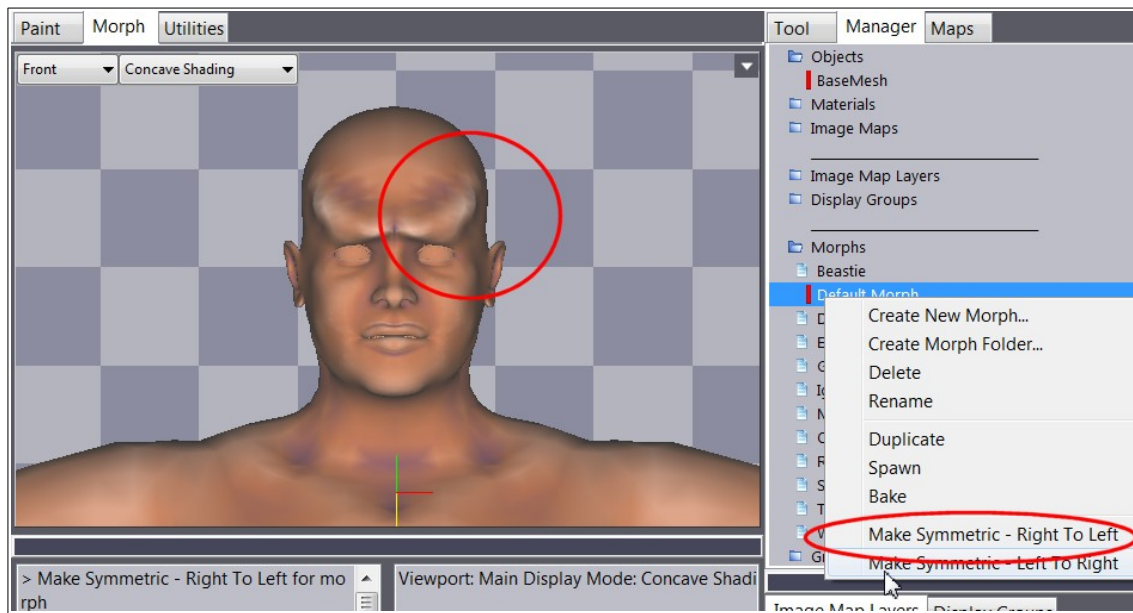
*Symmetric morphing with an asymmetric morph target*

Finally, a morph target can be made to be symmetrical after the fact. First, either undo the previous deformations and turn off symmetry. Then create a deformation on the **right side** of the model. Viewing the model from the front, this will be **your left**.

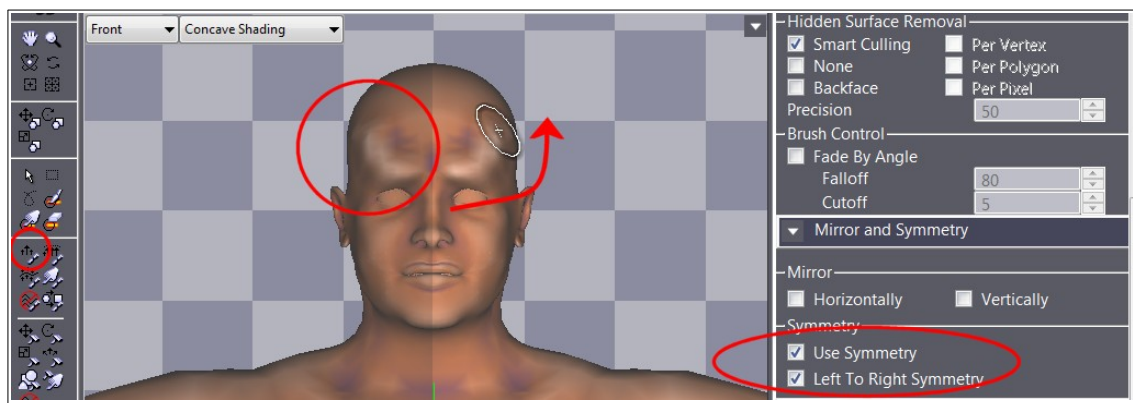




Next, press **CTRL-A** to select the entire object, and then locate the **current morph target** in the manager as indicated by the red marker ( it should be “Default Morph” ), and right click on it. Choose **Make Symmetric – Right To Left** and the morph target will now become symmetric.



Finally, let's show you how to reverse the direction of the symmetry. Undo the previous deformations, turn symmetry back on, and then enable **Left To Right** symmetry. Using the **Bulge Chisel** as before, deform the model on the **Left** side this time ( your right ) and see how the deformation is now duplicated on the other side.



## Hair Tools

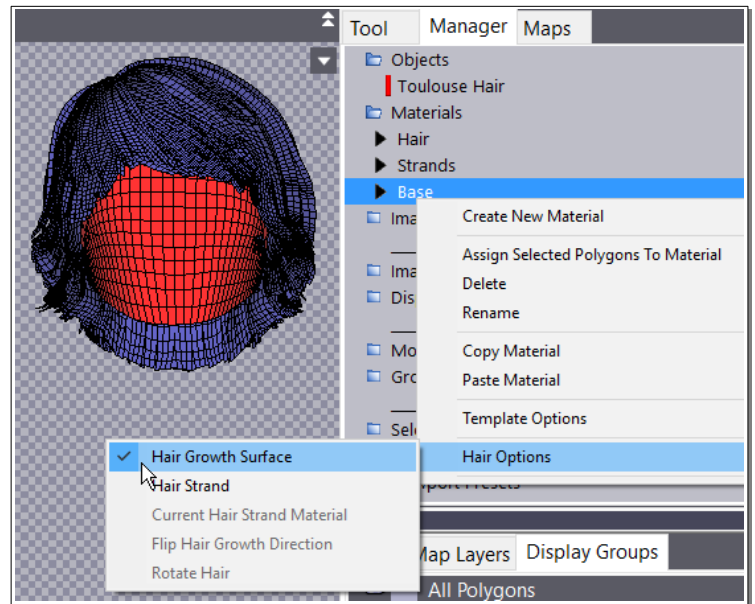
The hair tools allow you to create new hair, or edit existing ones in a simple and intuitive manner. Although hair objects can be edited using the standard morphing tools, there are several special cases in which they become impractical. Those include, but are not limited to...

- Preventing the roots from moving out of place.
- Achieving a smooth and natural soft selection of hair strands with a single click.
- Deforming multiple strands easily using SHIFT-CLICK
- Special considerations for the hair tips, so they move in a natural way
- Preventing the hair geometry from becoming distorted. Perform hundreds of deformations on the hair while the geometry remains clean and not “bunched up”

## Setting Up a Hair Model

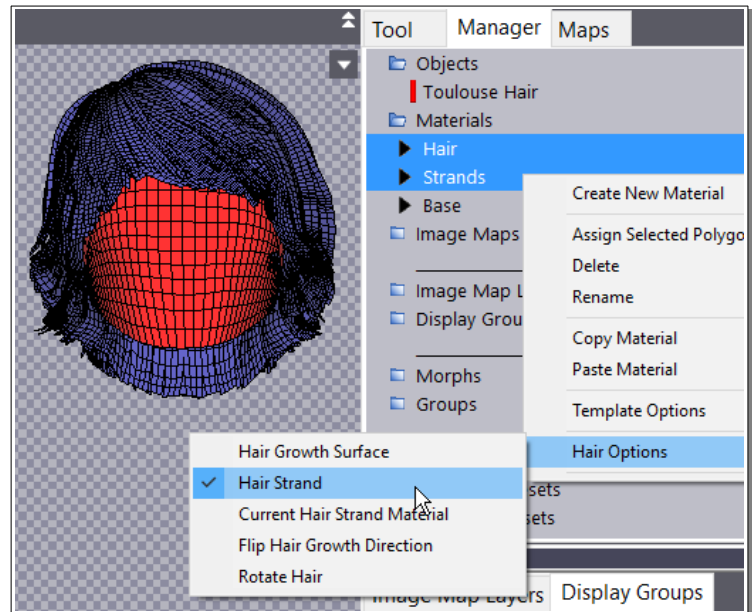
**Step 1.** Flag the material that represents the **Growth Surface**. Right-click on the material in the **Manager**, and under the **Hair Options** submenu, click **Hair Growth Surface**.

This is typically called a hair cap, skull cap, etc. This need not be limited to hair on the head. A body suit can be used as a growth surface for creating body hair, or fur for a creature, etc.



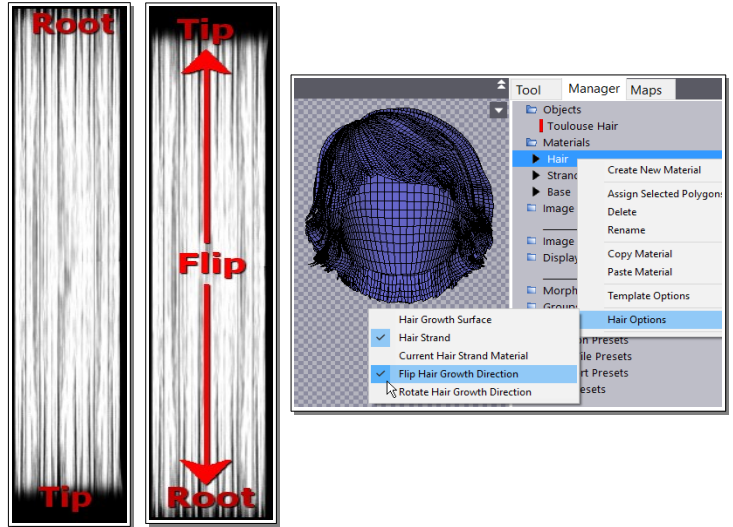
**Step 2.** Flag each existing material that represents **Hair Strands**. If you are starting off with an empty growth surface, then this step can be skipped.

Note, in the case illustrated here, both the materials **Hair** and **Strands** both represent hair strand materials.



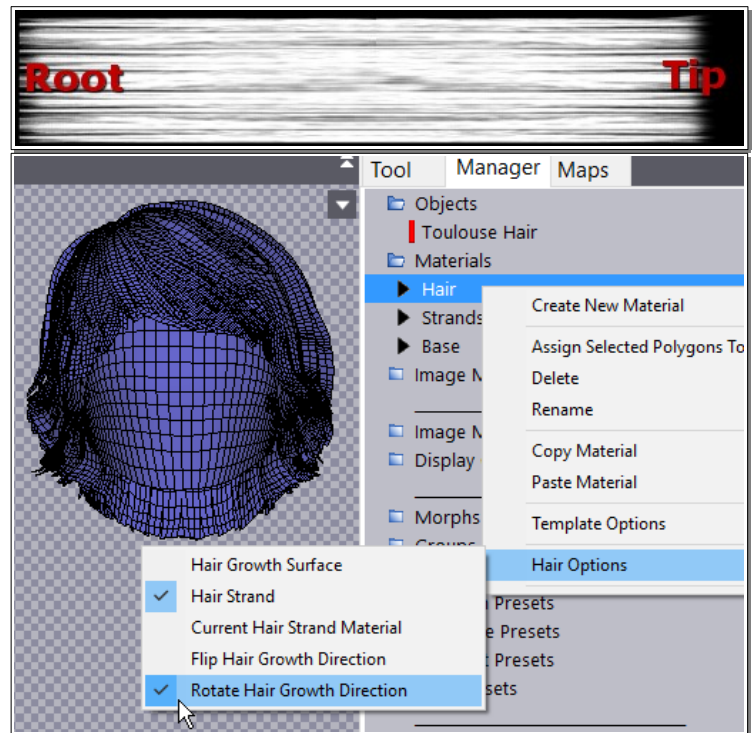
**Step 3.** ( optional ) Most hair models that we are aware of follow the convention that the direction of the hair strands, in UV space, go from top to bottom, root to tip. If this is the case for your hair model ( this is the case for hair strands created inside Blacksmith3D ), then nothing more needs to be done.

However, for the special case of the roots being at the bottom of the UV map and the tips at the top, then choose **Flip Hair Growth Direction**.



**Step 4.** ( optional ) Similar to step 3, if the hair model in question has the hair strands UV mapped such that they go from left to right in the UV map, then you will need to check the **Rotate Hair Growth Direction** option.

And finally, if the tip and root are reversed, then also check the **Flip Hair Growth Direction** option.



That's all you have to setup most hair models for editing in Blacksmith3D.



## Basic Usage of Hair Tools

**Hair** tools have a one step process for creating deformations, unlike **Hammers** which have a two step process ( Select, then deform ). Let's load in Hair-Example-01.blacksmith3D project and go through the most common hair tools.

Although this project is already setup for hair creation, lets take a look at what special parameters are required so Blacksmith3D will know that this object is supposed to be treated as "hair".

Locate the materials hair growth object ( in this case, the object is called skullCap ) in the manager. If there are multiple objects in the scene, there will be a sub-folder with the same name as the object ( skullCap ) and its materials will be exposed by expanding that folder.

( SCREEN SHOT )

Locate the material that represents the growth surface ( the actual cap, not the hair strands ) and right click on it. Then hover the cursor over the **Hair Options** sub menu and notice that the **Hair Growth Surface** option is checked. If it is not, then check it now.

( SCREEN SHOT )

If there are already hair strands attached to this cap, then there should be at least one material to represent the hair strands. Often, hair objects will have more than one material for hair strands, often corresponding to different layers of the hair. Right click on all of the hair strand materials and make sure that the **Hair Strand** option is checked in the **Hair Options** menu.

( SCREEN SHOT )

That's all you have to do to let Blacksmith3D know that the object should be treated as a hair object. One of the most important reasons for explicitly setting these parameters is so Blacksmith3D can match up the roots of the hair strands with the growth surface so it **knows** where the roots are. With that information, Blacksmith3D can automatically setup most standard hair objects to behave in the same way, whether they were created inside Blacksmith3D or not.

Now, let's create a few hair strands. Choose the **Hair Strand Creator** tool, and then click anywhere on the hair growth surface. A simple click and release will create a strand and automatically align it with the cap, or a click and drag will allow you to explicitly specify

the hair strand orientation

( SCREEN SHOT ) simple click

( SCREEN SHOT ) click and drag

You can repeat this procedure as many times as you like to create the hair style and density that you desire. To make things easier, let's do a bottom later first. Create hair strands on the cap so they look something like the following screen shot.

( SCREEN SHOT )

Now, let's edit these strands so they are in the general direction and style that we desire. Choose the **Strand Comb** tool, and set **Size** parameter to 80%, click near the tips of each strand and pull them down ( from a front, side or back view ) so they are roughly in the position that you want them to be. Don't worry about getting them perfect right now, a rough pass will be fine. Repeat for all strands.

( SCREEN SHOT )

Now, let's create a new material for the next layer of hair strands. This will allow us to use different maps for the color or transparency if we wish, or simply associate these strands together for utility purposes ( creating display groups, etc. ).

Create one strand for the new hair layer, and then use the **Picker** with the type set to **Element**, and click on the new strand so it, and nothing else is selected.

( SCREEN SHOT )

Then locate the materials for the hair object again, right click on any of the materials, and choose **Create New Material**. Now, that strand has the new material associated with it. Right click on the new material and choose **Rename** and change the name to **HairStrands2**.

( SCREEN SHOT )

Right click the material again, choose the **Hair Options** menu, and then check two options; first check **Hair Strand** and then check **Current Hair Strand Material**. Now, all new strands that are created will automatically be assigned this new material.

( SCREEN SHOT )

Create the new layer of hair in the same way as we did the previous one, by first creating the raw strands, and then using the **Strand Comb** to put them in their rough positions and lengths.

( SCREEN SHOT )

Repeat the procedure one more time and sill in the top of the head, so we now have three distinct layers of hair with separate materials.

( SCREEN SHOT )

Now, let us do some styling work on the hair. Choose the **Strand Comb** tool and click and drag on a few hair strands, and immediately undo the actions, just to get a feel for how it works. Notice that deformation centers around the point that you clicked on. So if you click near the tip, than that is the focus of the deformation. If you click mid strand, then that is where most of the deformation takes place.

Change the **Size** settings a few times using values from 5% to 100% and click on the strands at various locations from the roots to the tip. Notice how larger size values will affect most if not all of the strand, while smaller values are smaller and more focused.

( SCREEN SHOT )

In general, you will want to use medium to large values of size ( 30% upwards ) since hair styling in real life rarely requires you to focus on a very small segment of a hair strand. However, there will be some special cases where a small focused selection will be required.

Now, let's show you how to manipulate multiple strands at the same time. Click on one strand, hold shift, and click on a few more strands in the same general area. On the last click, drag the mouse and notice how all of the selected strands deform together.

( SCREEN SHOT ).

So, using these techniques, style the hair to get something like the following image, noting how we parted the hair away from the face and shortened the bangs.

( SCREEN SHOT )

Notice the geometry has quite a few kinks in it. So let's start off by doing a bit of straightening. Use the **Picker** tool with the type set to **Materials** and shift-click on at least one hair strand per material layer that we created. Now, all of the hair strands should be selected.

( SCREEN SHOT )

Then choose the **Strand Straightener** tool, click in the viewport ( but not directly onto any surface ) and drag the cursor up. Often, several smaller click and drags will yield a better effect than one big click and drag, so experiment with that a bit. Notice how most

of the kinks in the geometry have been smoothed out.

( SCREEN SHOT )

Now, let's put some WAVE into that hair. Choose the **Strand Waver** tool, and set the **Auto Selection Size** to 100% and set the **Wave Size** to 20%.

Click and drag on an individual strand and notice how it becomes wavy. Also notice how the roots of the hair still stay in place ( since the **Lock Roots** option is on by default. )

( SCREEN SHOT )

You can also select all of the hair using the picker and click and drag ( in the blank space outside the object ) to make all of the hair wavy at the same time.

( SCREEN SHOT )

Finally, choose the **Strand Volumizer**, and click and drag to add some volume to the hair. This tool is quite sensitive, so a little goes a long way.

( SCREEN SHOT )

Now, that's the basic technique for creating and editing hair strands. To make a high quality hair object, you'll need to spend some time getting the hair strands styled "just right", and you'll need to be able to easily focus on the individual hair layers that you defined when creating separate materials.

Now, let's create a **Display Group** for these layers. Use the **Picker** tool, choose the **Material** option, and then click on one of the hair strands. Notice how all of the strands that share the same material get selected. Now, create a display group using this selection and rename it to the same name as the material you just selected ( hint, when using the picker, the message window will say *Picked the material "material name" in the object.* See the Creating and Editing Display Groups tutorial if you are unfamiliar with this process.

( SCREEN SHOT )

To make it easier to select the other layers, immediately set the new display group to **Hidden**, and repeat the process until you have a display group for each material.

( SCREEN SHOT ).

Hint... if the hair object is the only object in the scene, then you can right click on Display Groups and choose **Create Display Group from Materials** and a display group will automatically be created for all materials in the scene. If you have character loaded in the

scene as well, then the number of display groups created may be quite large, so manually creating them is the preferred method.

Now, you can lock, hide or show each of the hair layers using the display groups.



## Exporting and Importing Templates

In Blacksmith3D, templates are subsets of projects that can include one or more types of assets. For example, a template can contain just an object, or just image maps, object and image maps, specific image map layers, etc.

Let us now load in the project Template-Example-01.blacksmith3D. Notice that this project contains every type of asset available in Blacksmith3D ( objects, image maps, morphs, etc. ).

The first template we will export is just the object. Click on **Menu->File->Export**  
( SCREEN SHOT )

Next, choose **Blacksmith3D Template** from the drop-down menu. You will notice that a tree structure will appear that is similar to the **Manager**. The first thing to note is the round “radio buttons” which are turned off by default. Clicking on these will turn them red, and indicate that that category of assets should be exported.

( SCREEN SHOT )

Note that even if items inside the category are checked for export, if the category is not flagged for export ( big red dot ), then they will be ignored.

So, with that being said, click on the radio button in front of **Objects** and then expand the objects by clicking on the plus ( + ) sign, and make sure the object is checked, and then click on OK.

( SCREEN SHOT )

Then click on **Menu->File->Create New Project**

( SCREEN SHOT )

Then drag and drop the newly created template file into the viewport. Notice that just the object appears, and all of the other assets ( image maps, morphs, etc. ) are not included.

That was relatively straight forward. Now, let us consider something a little more complex. We will export materials and maps, but NOT the object. What this will do is allow us to have a material and map set that can be applied to this particular object when it is already loaded in a project.

Please reload the file Template-Example-01.blacksmith3D.

Next, click on **Menu->File->Export->Blacksmith3D Template**. Uncheck the **Objects** radio button and check both **Image Maps** and **Materials**. Expand each of those categories and make sure that all of the items within are checked, and then click **OK**. Specify a file name, and then export the file.

( SCREEN SHOT )

Now, Delete all of the image maps in the current project. Click on the **Manager** tab, expand the **Image Maps** folder, multi-select all of the maps, right click and choose **Delete**.

( SCREEN SHOT )

At this point, the project has no image maps, and the object has no maps associated with it's materials.

Now, simply drag and drop the newly created template into the viewport. When it has finished loading, you will see that not only have the image maps been loaded in, all of the material associations with the object have been restored.

( SCREEN SHOT )

You can create templates like this one for a variety of situations. For example, for character creation, you may have a basic set of skin textures that you start off with, and build new textures on top of that. Use this technique to to quickly apply the textures when setting up a new project.

( SCREEN SHOT )

You can repeat this procedure for morphs, but instead of checking the **Image Maps** and **Materials** option, you can check **Morphs**. Do everything the same as you did in the previous example ( but instead of deleting the image maps, delete the morphs ) and you'll see how easy it is to create a template containing morphs.

This is especially useful if you have a set of commonly used morphs. The morphs may be **end user** morphs that are included in your final product ( e.g. facial morphs, etc ), or they may be **utility morphs** that you use to help facilitate certain tasks. For example, you may create a morph to move the inner face geometry of a character outside of the head for easy access and editablity.

( SCREEN SHOT )

Most of the assets are relatively straight forward, so you can repeat the same steps above to create templates for them ( Presets, Display Groups, etc. )

There is a special case that is quite powerful and requires a few extra steps. If you would like to export a set of Image Maps and Materials like our first example, but only include certain layers, then please do the following...

Please reload the file Template-Example-01.blacksmith3D.

Then, create a new **Image Map Layer** and rename it to **Overlay**.

( SCREEN SHOT )

In the viewport, paint some details over the character.

Now, under the **Image Map Layers**, right click on the **Background** layer and uncheck the option **Exportable To Template**.

Next, repeat the procedure for exporting a template containing **Image Maps** and **Materials**.

Now, reload Template-Example-01.blacksmith3D so the changes to the image map layers is lost.

To help illustrate what is happening, make a few paint strokes on the surface of the object, so we can see that the textures have been modified.

( SCREEN SHOT )

Drag and drop the new template file into the viewport. Notice that the modifications to the base layer that we just made are still there, and the layer that was stored in the template is now applied on top of it.

This is especially useful when you have multiple image maps with layers. To do this in a traditional 2D application, you would have to repeat a similar procedure for every map in the project, while Blacksmith3D templates will process the layer data for all of the image maps at the same time. So if you have a skin overlay that spans across the face, body, arm, etc. then this one template export/import operation will keep all of those layers in sync.

( SCREEN SHOT )

It is also important to note that you can mix and match categories in the templates. A complete “character” template may contain Image Maps, Materials and Morphs ( which will constitute all of the end user data ) and may also contain Display Groups, Image Map Layers, Presets ( which are for the artist's convenience ).

## Asset Management

In Blacksmith3D, anything that you create will exist in the **Manager** tab. This is where all of your stuff is organized. The manager consists of a tree with folders that can be expanded to reveal their contents. For example, the **Objects** folder will contain all of the 3D objects currently present in the project. The **Maps** folder will list all of the image maps ( textures, bumps, transparency maps, etc. ).

Most items can be edited by right clicking ( CTRL-Left click on Mac computers with no right mouse button ) on them to invoke the popup menu which will reveal options like **Create New, Delete, Rename**, etc. . So, if you would like to edit one of your assets in some way, right clicking on it in the Manager may be the first place you look to do so.

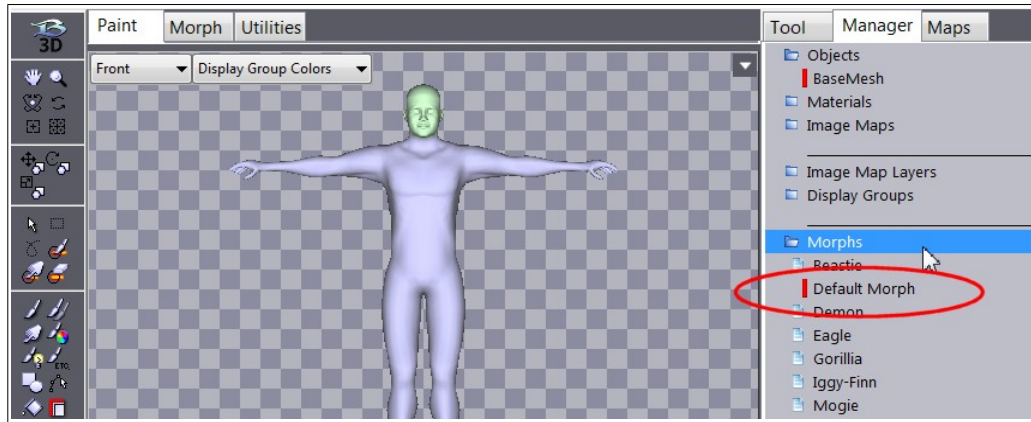
It is also important to note that some of the most commonly used portions of the Manager are duplicated elsewhere in the interface, such as the **Maps Tab** at the top-right, and the **Image Map Layers** and **Display Groups** at the bottom-right. These have their own sections for quick and easy use, and also to be consistent with most 2D painting applications, which handle their layers in a similar way.

The following tutorials will walk you though the most common tasks performed in the Manager.



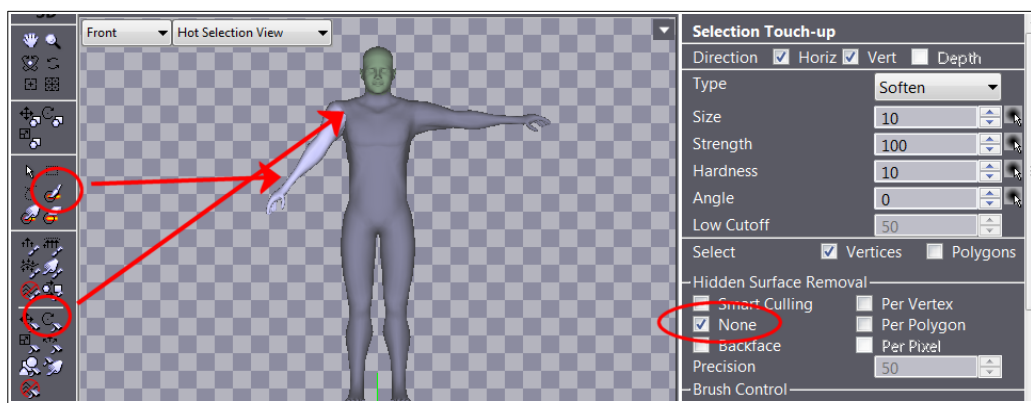
## Managing Morphs

Please begin by loading the project **MorphedMan.Blacksmith3D**. Once the project has been loaded, click on the **Manager** tab, locate the **Morphs** folder and double click it to expand.

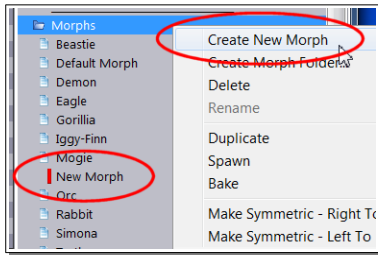


Note that there are several morph targets that have already been created, and a **Default Morph**, which is the current morph, as indicated by the red bar.

Using the techniques described in the **Morphing** tutorials, apply a few deformations to the object. They need not be anything elaborate, we just want to demonstrate the management work flow. Here we used the selection brush with **Hidden Surface Removal** set to **None** to select the arm, then we used the **Rotate** hammer to rotate arm.

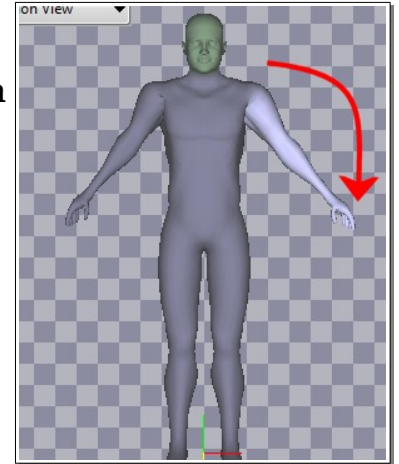


Since the **Default Morph** is the current one, the deformations have been applied to it.

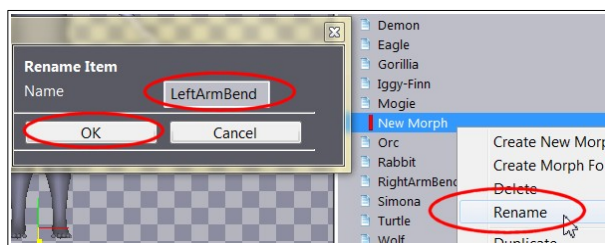
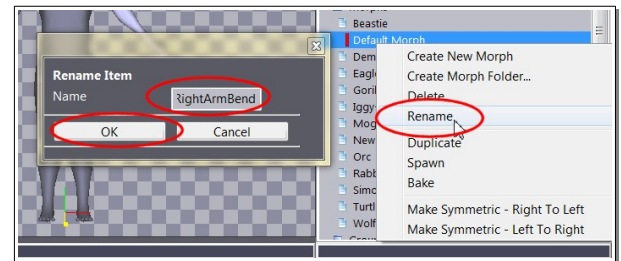


Now, since the purpose of this tutorial is demonstrate **Morph Management**, let's create a new morph target. In the Manager, right click on the **Morphs** folder and choose **Create New Morph**. Notice how the **New Morph** is now the current morph ( red

marker ). Now, create another deformation. Here we simply rotated the other arm. Again, please see the **Morphing** tutorials for more information on the basic morphing workflow.

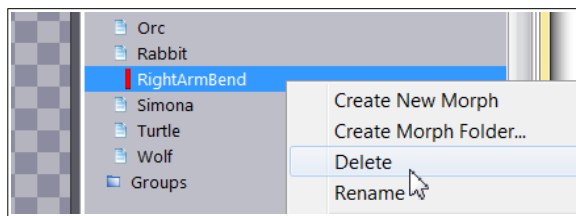
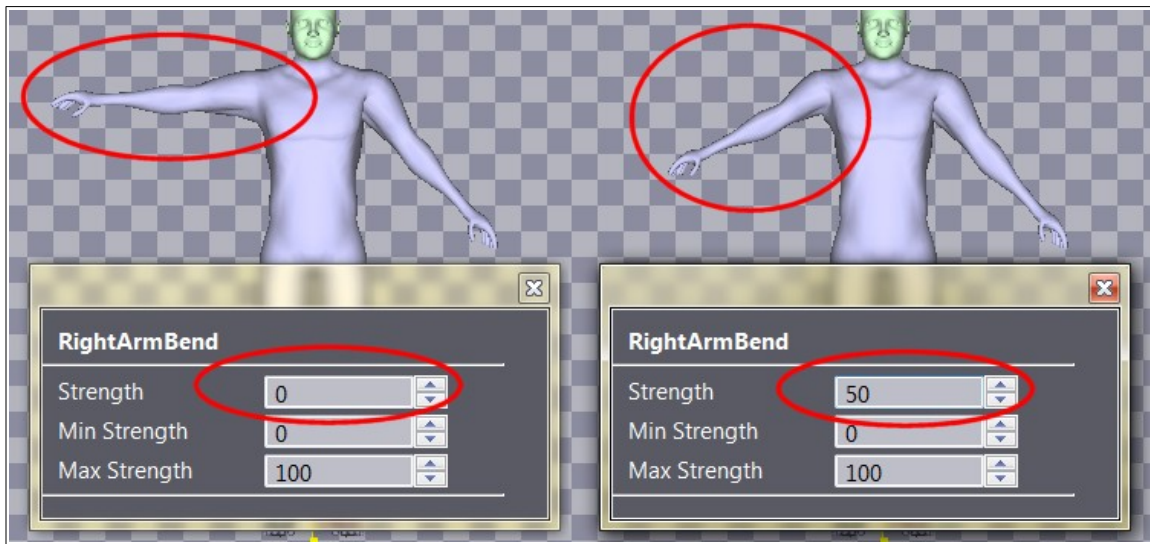


Ok, now we have two morphs, one deforming the right arm, and the other deforming the left arm. So, let's rename the morphs to reflect this. In the **Manager**, right click on **Default Morph**, and then choose **Rename**. In the dialog, enter "RightArmBend" and then click **OK**.



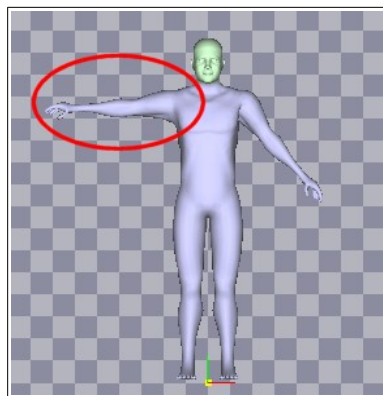
Next, right click on **New Morph** and repeat the procedure, calling it "LeftArmBend".

Just to emphasize that the two deformations exist in separate morph targets, double-click **RightArmBend**, and set the strength to 0%, observe the result, then set it to 50% and observe again. Notice how the deformation in the left arm is not affected. We now invite you to repeat the procedure with the **LeftArmBend** morph, then reset the strength of each morph back to 100%.



So, we've covered creating and renaming morphs, so now let us delete one of them. Right click on **RightArmBend** and choose **Delete**. Since the action cannot be undone, you will be prompted to confirm, so choose **Yes**. Now, as expected, the

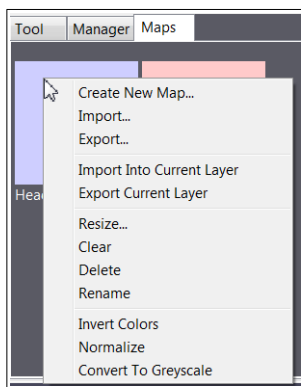
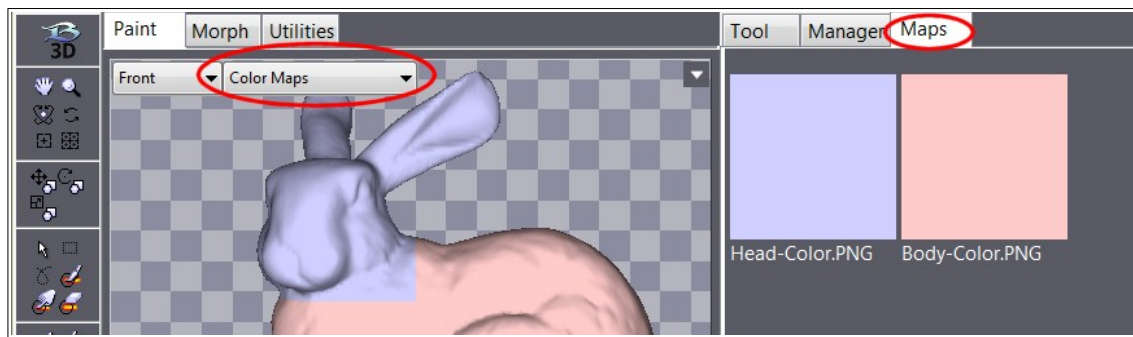
morph has been deleted from the manager and its deformation has been removed from the viewport.



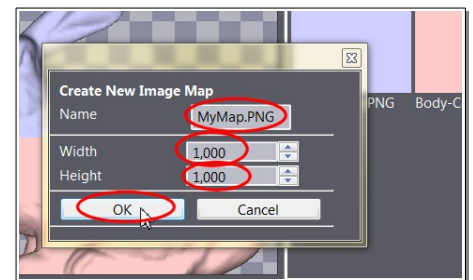
## Managing Image Maps

In Blacksmith3D, the images that are used to texture a model's color, bump, transparency, etc. channels are referred to as **Image Maps**. They appear in two places in the interface; the **Manager** and the **Maps** tab.

Please load the project **Textured-Bunny-Multi.blacksmith3d**, and then click on the **Maps** tab. Notice how there are two image maps, and how they are visible in the viewport when the display mode **Color Maps** is used.

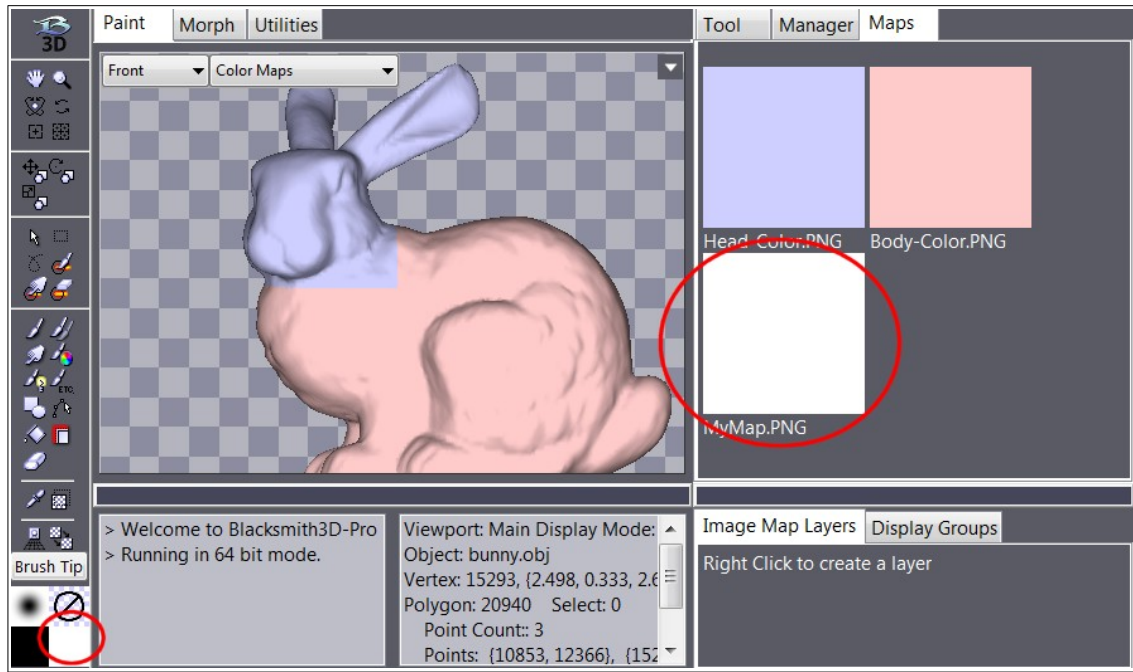


To manage the maps, you can **right click** on one of them to get a pop-up menu. First, let us start off by creating a new map. Click on **Create New Map**. You will then be presented with a dialog to specify the name and dimensions of the map. Please note that the file extension must be present in the file name, even if you have no plans to export the image any time soon. So

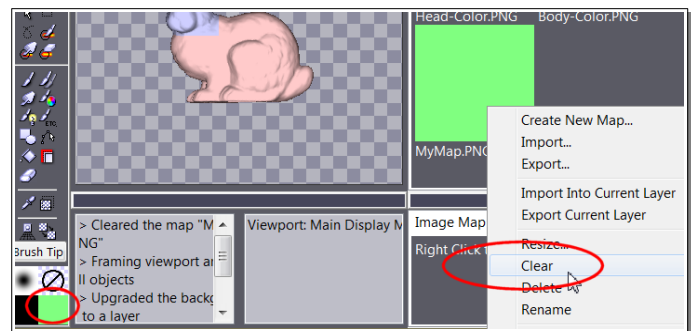


enter the name **MyMap.PNG** and enter 1000 in for **Width** and **Height**.

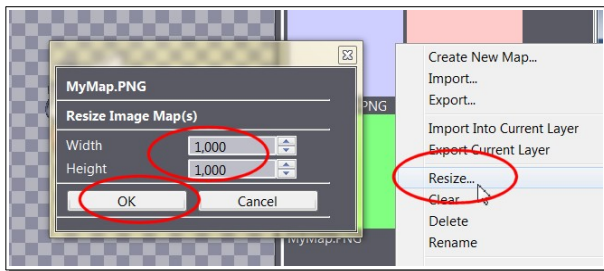
Notice how the color of the map is that of the **Secondary Color**.



If you would like it default to another color, either change the secondary color before creating the map, or change the secondary color and then choose **Clear** from the pop-up menu. This is the default behavior when **no Image Map Layers are present**. When there is at least one Image Map Layer, then the default behavior is the map will be fully transparent (  $\text{Alpha} = 0$  ), unless you hold the **ALT** key when choosing **Clear**, in which case it will clear the current layer ( of the specified image map ) with the solid secondary color instead.

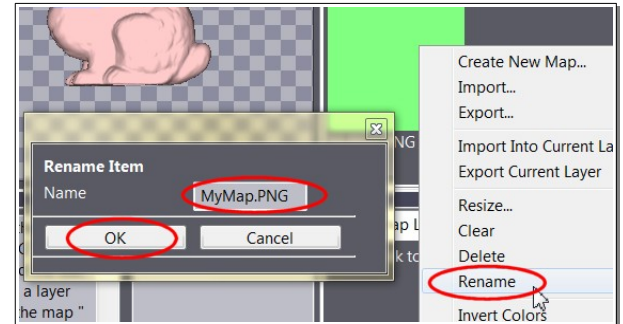






Now that we have created a new map, let's resize it. Choose **Resize** from the pop-up menu and enter 1500 for the width and height, and then click **OK**.

Likewise, you can rename the map, making sure to keep a file extension in the name. Right click on the map and choose **Rename**.



Now, to demonstrate how to delete image maps, let us do it in the Manager. You could right click on each map, but we want to show you how to delete multiple maps at once. Highlight two of the maps, by clicking on one, holding shift, and clicking on the next. Then right click and choose **Delete**. After being prompted to confirm

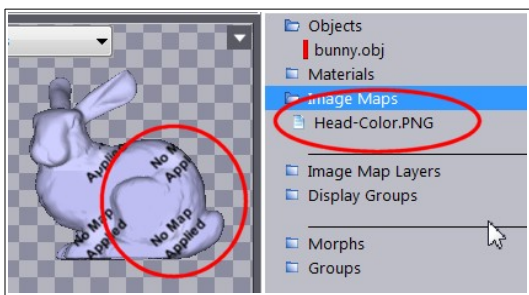
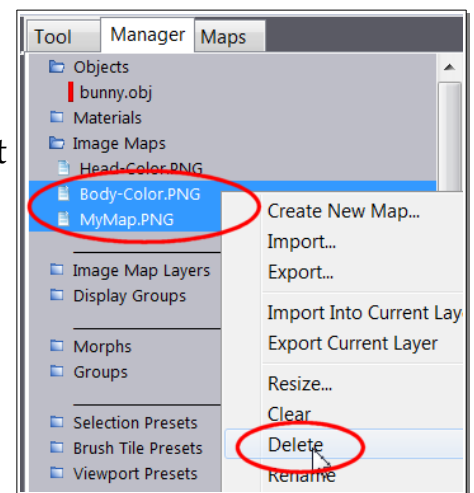
( cannot be undone )

click **OK**, and

observe how the

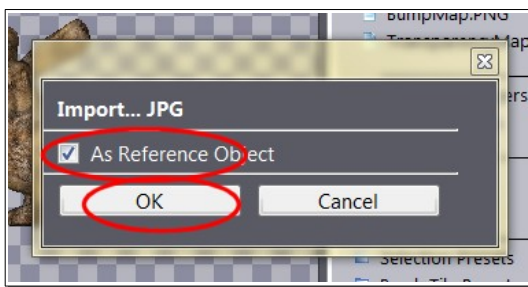
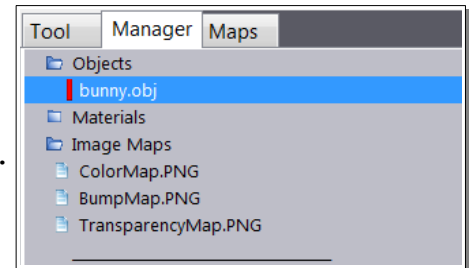
maps have now been

removed from the project, and notice their absence in the viewport.



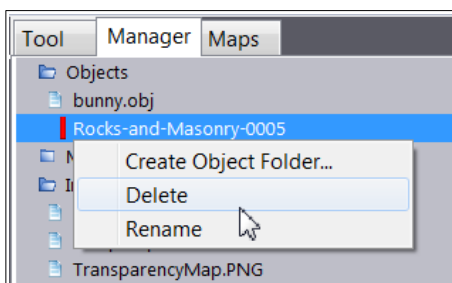
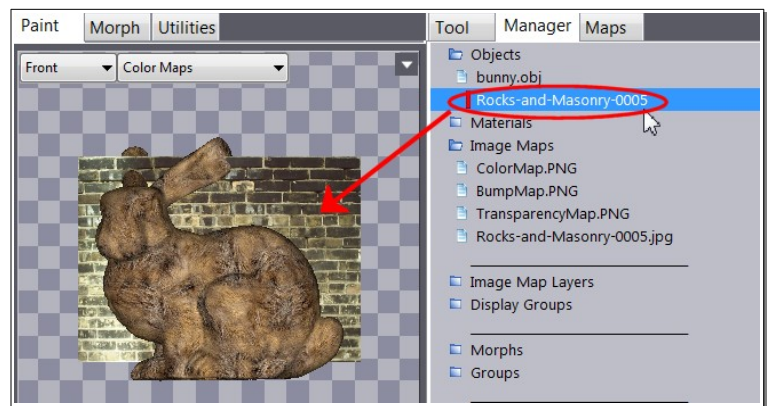
## Managing Multiple Objects

Blacksmith3D is capable of editing multiple objects, and most of the time, you can edit multiple objects in the same operation ( e.g. paint stroke, selection, deformation ). Here we will learn how to manage objects. Please load the project **Textured-Bunny.blacksmith3d** and click on the **Manager Tab**. Double-click the **Objects** folder.



Notice there is only one object. To create a second object, drag and drop an image file into the viewport. When the dialog window pops up, check the **As Reference Object** check box and then click **OK**. This will create a simple rectangular object and apply the image as a color map for it.

Notice how now a second object appears in the viewport. Also notice how it does not have a file extension, because the object itself was auto-generated.

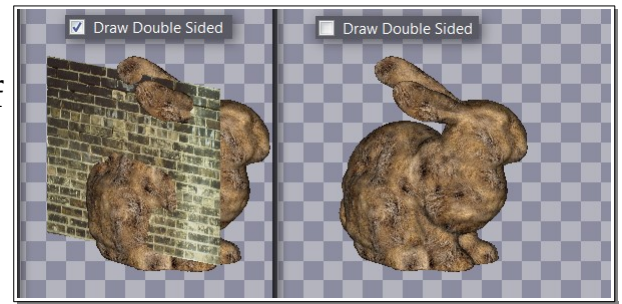


Right click on the new object to see what options we have available. Renaming and deleting the objects behaves the same way we do it in the other tutorials ( **Managing Morphs**, etc. ) so we won't show you every step here. Please rename the new object to **MyObject** .

Double-Click on **MyObject** to reveal it's parameters. First, notice the basic mesh info at the top, displaying the number of vertices, polygons and UVs. Next, are the **Display Options** such as **Reference Object** and **Draw Double Sided**. In this case, they are both checked ( as a result of importing the image as a reference object ).

The **Reference Object** option limits most of the editing for the object, since it is supposed to be there “for reference only”. So if you attempt to paint on it, you should get a warning object about not painting on reference objects, and the paint will not apply. You can however, use the **Transformation Tools** to reposition, rescale or rotate the reference object as you see fit.

The **Draw Double Sided** option will, as you might expect, draw every polygon, regardless if it's surface normal is facing the viewport or not. If we rotate the view to a backfacing angle, and then turn off **Draw Double Sided**, the image will disappear, only to re-appear if we rotate back to the front ( or turn **Draw Double Sided** ) back on.



The **Symmetry** section contains options for how the symmetry calculations are performed. For more information on symmetry, please see the [Deforming With Symmetry](#) tutorial.

## Importing and Exporting

Since Blacksmith3D is a middleware editor, you cannot create 3D objects from scratch. You import 3D objects and 2D images, edit them in any number of ways, and then export the results. As such, you should be mindful of exactly what you need to import, and what you need to export. For example, if you are painting a single texture for a 3D object which has already been UV mapped, your work flow would go something like this...

- Import the 3D object
- Create a texture map with the desired name and dimensions
- Apply it to the surface of the 3D model
- Paint details onto the surface
- Export the texture map
- Use the original object and the newly created texture map in the 3D program of your choice.

Note that in this scenario, there was absolutely no reason to re-export the 3D object. There are often many details that are omitted when exporting/importing 3D objects from one platform to another, so it is often best to minimize such exchanges.

Another scenario is when you import a 3D object that already has textures associated with it, and you would like to either edit the existing ones, or create new ones with the same **map-material** associations. In this case, it is best to import the object with the existing maps assigned to the appropriate materials, paint over the existing maps, rename them, and finally export the newly painted maps.

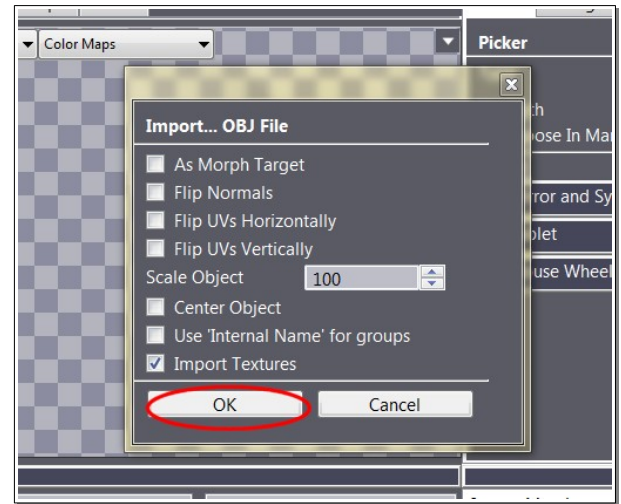
There are of course other scenarios, and we will cover several of them in the following tutorials.

## Importing and Exporting OBJ Files

To import an OBJ file, you can click **Menu-File-Import...**, and then locate the OBJ file. You can also drag and drop the OBJ file into the viewport. In either case, you will be presented with a few options before the import takes place.

Now, the options you choose will depend on what it is you want to accomplish, and what program you exported the software from.

For now, let's assume that you would like to paint a texture, so the default options should suffice.



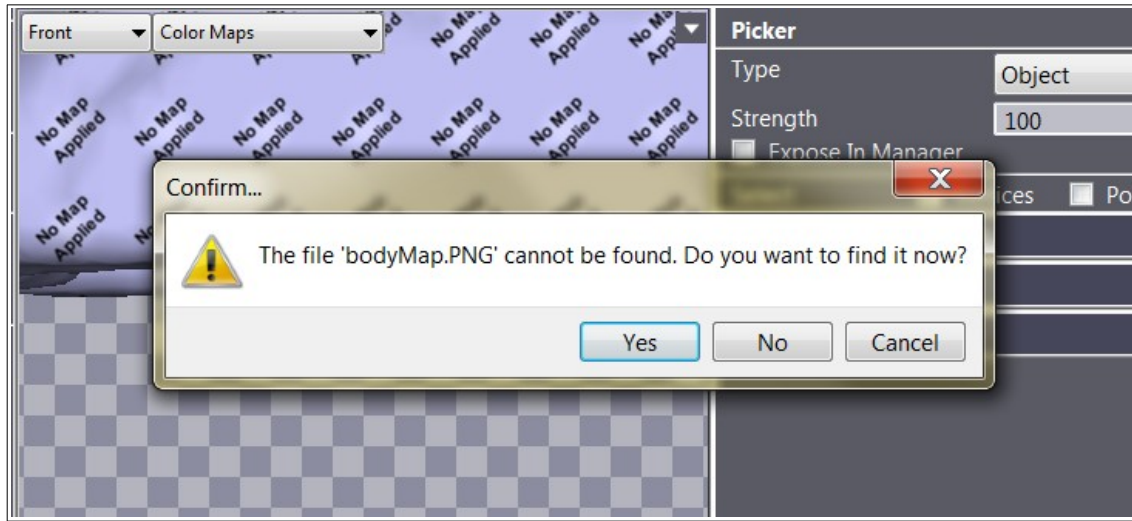
When you exported the OBJ file from another program, it may have generated a matching MTL file, which is an ASCII text file that you open and read if you wish. This is where the material information such as colors, texture maps, bump maps, etc. is stored. If this file is missing, then that information will not be imported. The following is an example of what you may expect to see in an MTL file.

```
newmtl Body
Ka 0.000000 0.000000 0.000000
Kd 1.000000 1.000000 1.000000
Ks 0.000000 0.000000 0.000000
d 1.0000
map_kd bodyMap.PNG
newmtl Head
Ka 0.000000 0.000000 0.000000
Kd 1.000000 1.000000 1.000000
Ks 0.000000 0.000000 0.000000
d 1.0000
map_kd headMap.PNG
```

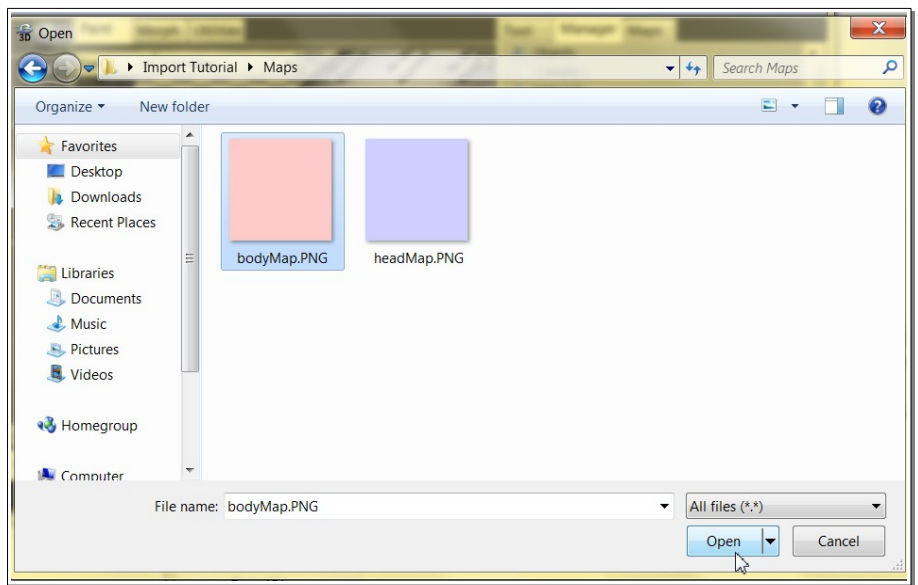
If you are expecting your OBJ file to have texture maps assigned, or have certain colors associated with the material, then double check this file to be sure that information is in there. Please note that not all texture map channels are supported in OBJ/MTL files, and the ones that are are not necessarily supported by any particular 3D application, so be prepared to setup maps manually if required.



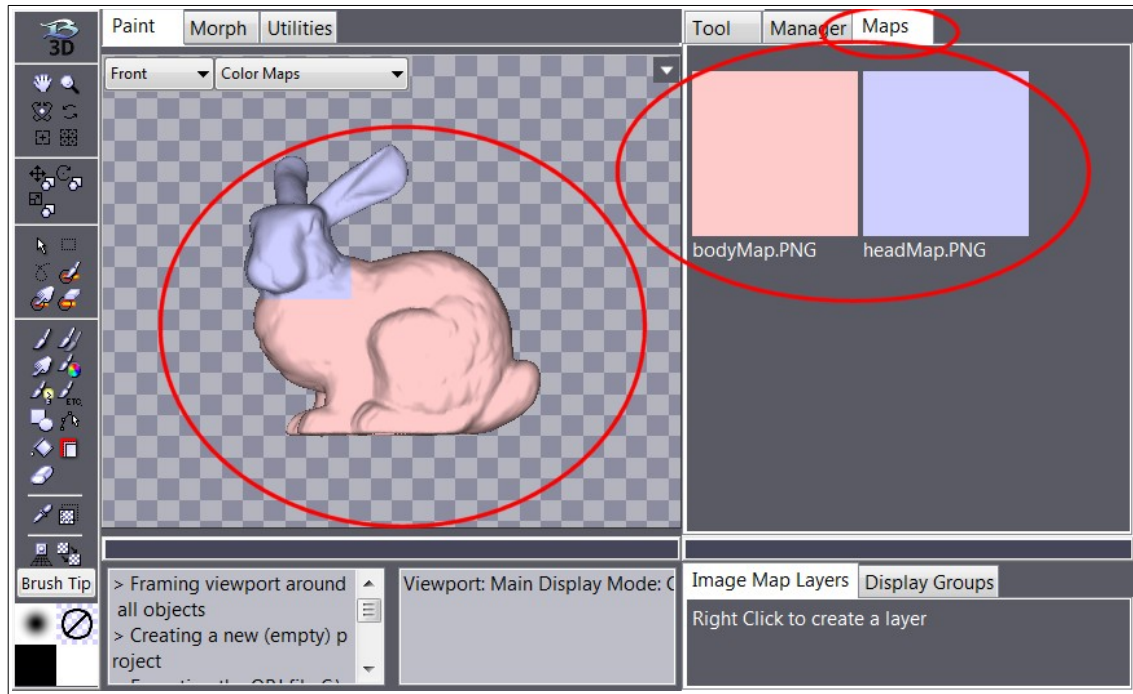
Getting back to our import, click on **OK** to import the model into Blacksmith3D.



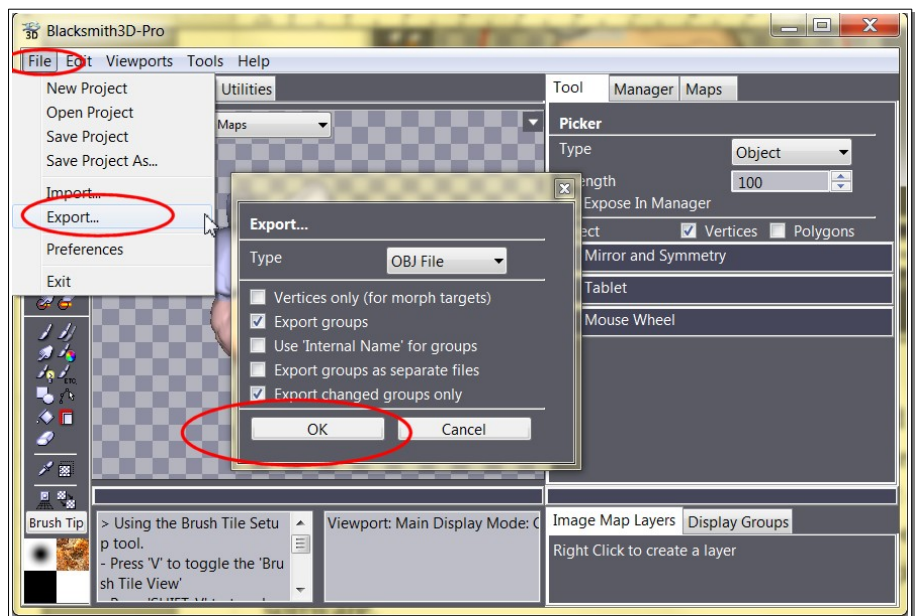
In this case, one or more of the texture maps specified in the MTL file could not be automatically located. If the textures are in the same folder, they should be found and you should not get this message. In any case, if you would like to locate the original texture maps, click on **Yes** and locate the file manually.



Now the object has been imported, along with the two original texture maps. If you noticed in the **Import Options** window, the **Import Textures** option was checked by default. If you do not wish to import the original textures, you can uncheck that before proceeding.

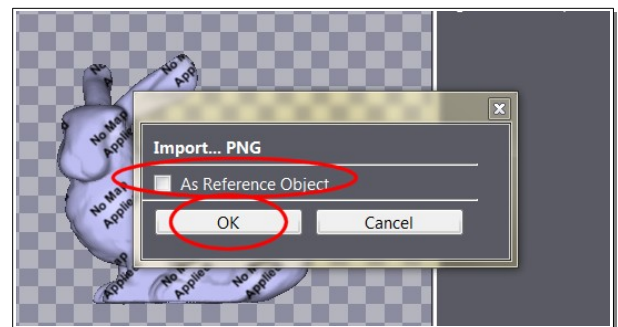
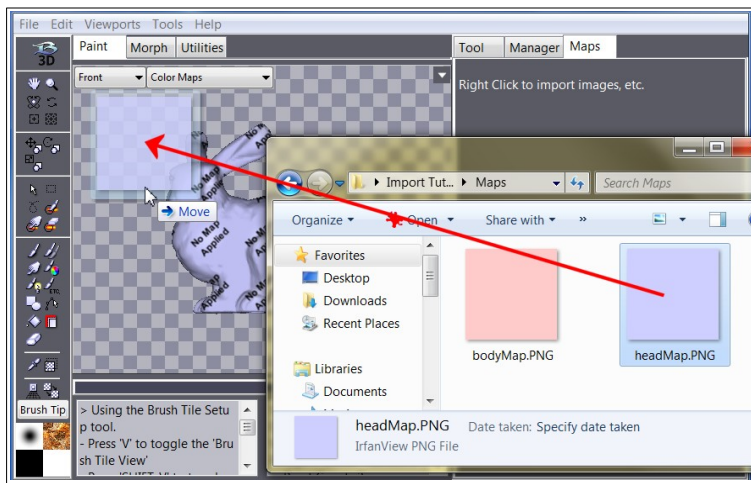


To export the model, choose **Menu-File-Export** and then choose **OBJ File** as the type. Please note that for many projects, you may not need to re-export the model. For example, if you are painting a texture and have not changed the UV mapping ( via the Paint Setup Wizard ), then you may not want to re-export the model. You can simply export the new textures and apply them to the original model in your rendering software.

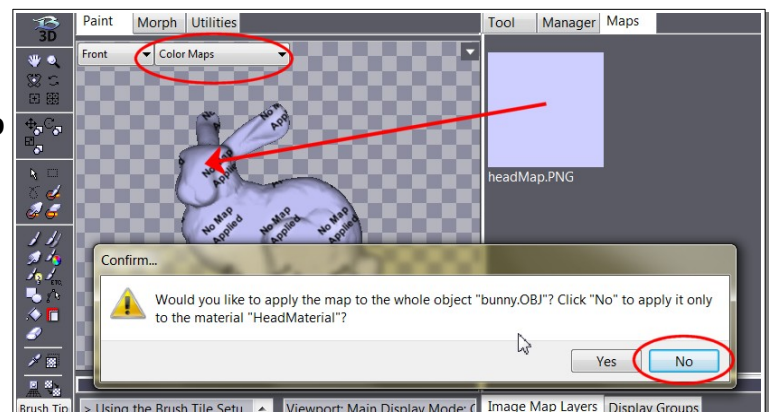


## Importing and Exporting Image Maps

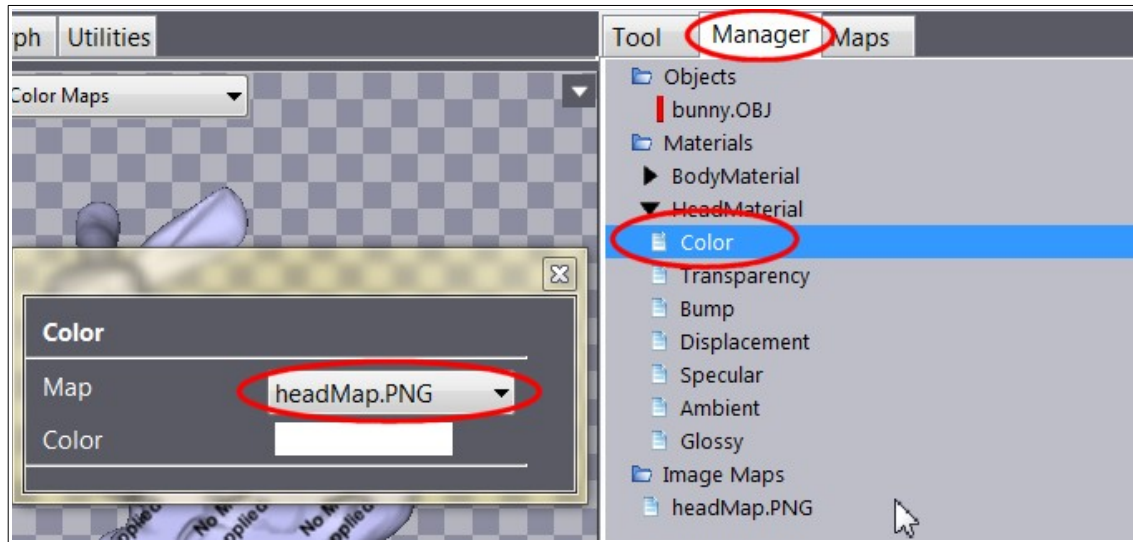
To import an **Image Map**, you can drag and drop it into the viewport from the OS file manager. Be sure not to check the **As Reference Object** unless you would like a rectangular object created with the image map applied to it ( used for reference photos ).



Now, the image map will appear in the **Maps** tab, and the **Image Maps** section of the **Manager**. To apply the map to a material on the object, you can drag and drop it from the **Maps** tab onto the surface of the model. When prompted, you can click **Yes** to apply it to the whole object, or **No** to apply it to the material that it was dropped on. In this case, the map is meant to be on the **Head** material only, so drag and drop it onto the head and then click **No**.



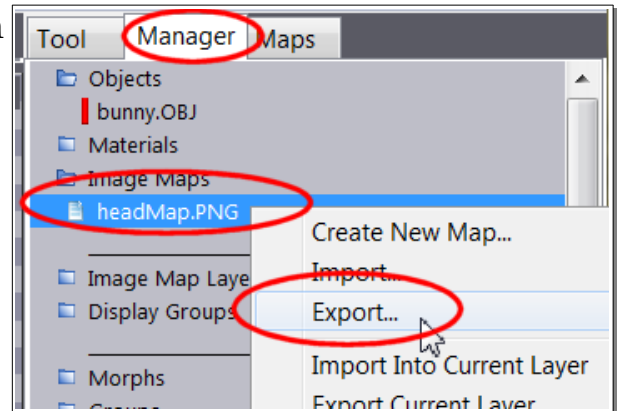
Please note that since **Color Maps** is the default display mode, the image map will be assigned to the **Color** channel of the **Head** material. Please also note that you can assign **Image Maps** to specific **Material Channels** via the **Manager**.



To export a map, simply right click on it's icon in the **Maps** tab, or right click on it's entry in the **Manager**, and then choose **Export...** . Locate the folder that you wish to save the file to, change the file name if desired, and then click on **Save**.

Note that if you do change the file name or extension of the file, it will change in the Manager as well. This is important if you are exporting a geometry file and textures; You

should export the textures **first**, so when you export the geometry file ( e.g. OBJ ), it will know the proper file names and paths ( if applicable ).



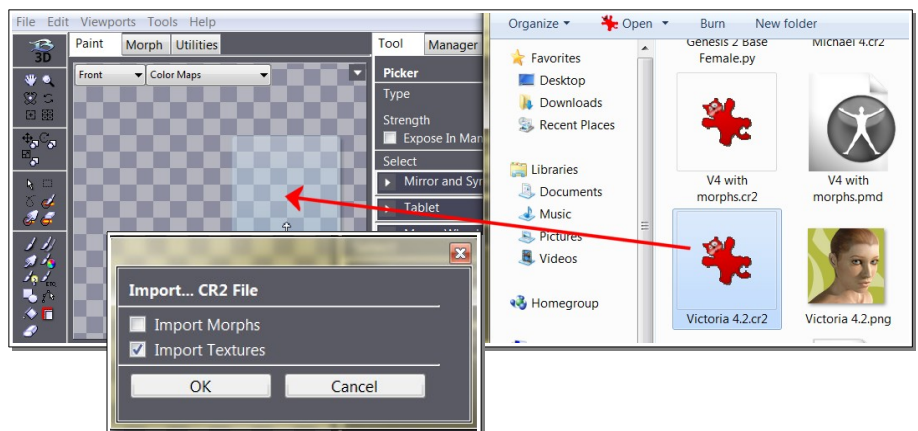


## Importing and Exporting CR2 Files

To import a CR2 file, simply drag and drop it into the viewport. There are two options... **Import Morphs** and **Import Textures**. Please note the following considerations...

- The morphs in the CR2 file should not be saved in a binary file. They should be saved directly inside the CR2. Please consult the documentation of Poser for more details.
- You should setup the CR2 file in such a way that it only has the morphs that you actually require for your Blacksmith3D project. CR2 files can often contain hundreds of morph targets, and you may run into serious performance issues in Blacksmith3D if too many are loaded at once.
- Not every CR2 file is supported by Blacksmith3D. It is a very dynamic file format that can be customized in any number of ways that may interfere with it loading it properly in B3D. Most notably, only characters consisting of a single object are supported.
- Only simple image map shaders are supported for import. Complex shaders will not be recognized and you may have to manually import and setup the maps.

Let us now drag and drop a CR2 file into Blacksmith3D. Make sure **Import Morphs** is not checked and **Import Textures** is checked. Now, if all goes well and the textures are in the same Runtime structure, the character should be imported with the textures applied. Again, it's important to note that **only simple image\_map shaders are supported**. Otherwise, you may have to import and assign the textures manually.



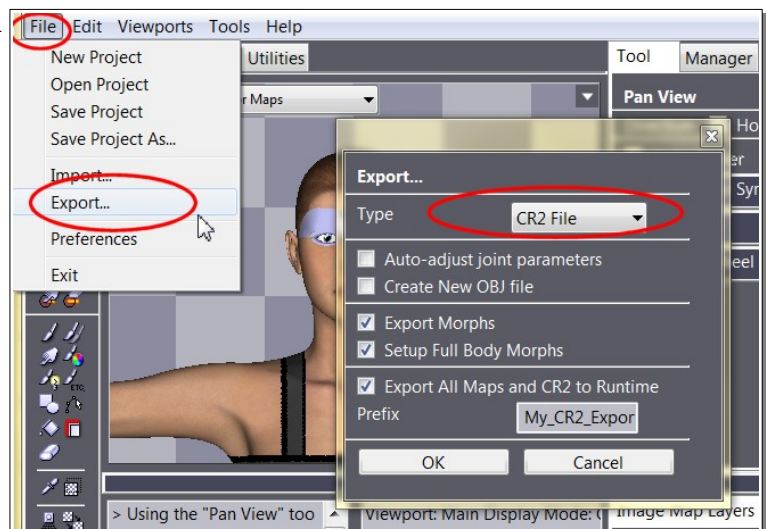


Now we see the character imported with the textures applied. In this case, there are untextured portions on the face for the eyebrows, eyelashes, etc. You may think this is some sort of error, but they are designed to have transparency maps applied to them. When editing the face textures, you can use the **Picker**, with the type set to **Materials**, to select those regions. Then choose **Menu-Edit-Hide Selected Surface** to get them out of your way. For more advance ways of dealing with hidden geometry, please see the **Display Groups**.



After you have painted the textures as you see fit, you can export the result in any number of ways. You can export a CR2 file, but the preferred method would be to export a MAT file instead if you are simply texturing the character. But for now, we'll show you how to export the CR2 file.

Choose **Menu-File-Export...** and then choose **CR2** from the **Type** drop-down box. Also note the **Export All Maps and CR2 to Runtime** option. If this option is checked, then B3D will create folders in the appropriate places and save the CR2 and textures into the Runtime structure. It will use the **Prefix** to name the folders, which is **My\_CR2\_Export** by default.



You can export the files into a blank Runtime folder if you want to prepare the files for distribution as well, so you can quickly ZIP the Runtime folder, and it will only contain the CR2 and texture files.

Please note that you **may be required to locate the original CR2 file**, since it contains a lot of information that is not stored inside Blacksmith3D, so it's required to generate a new CR2 file.

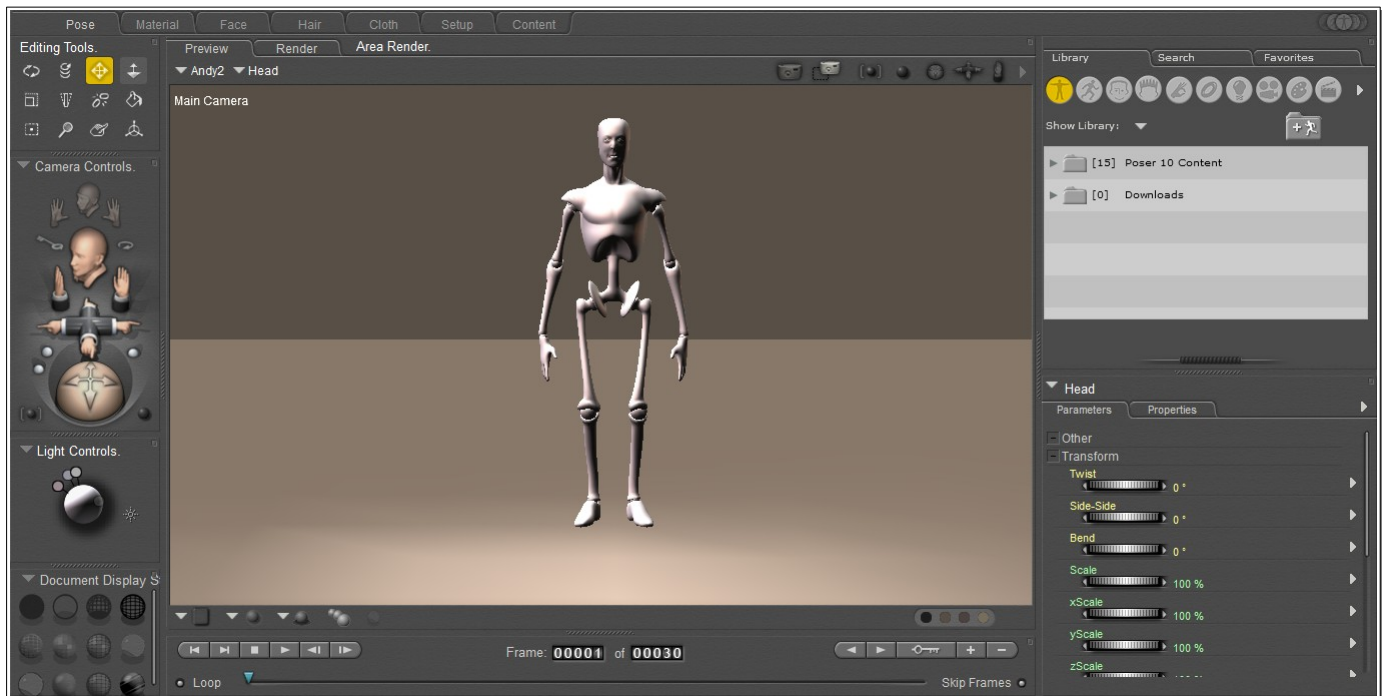
## Creating morph targets for Poser via OBJ import/Export

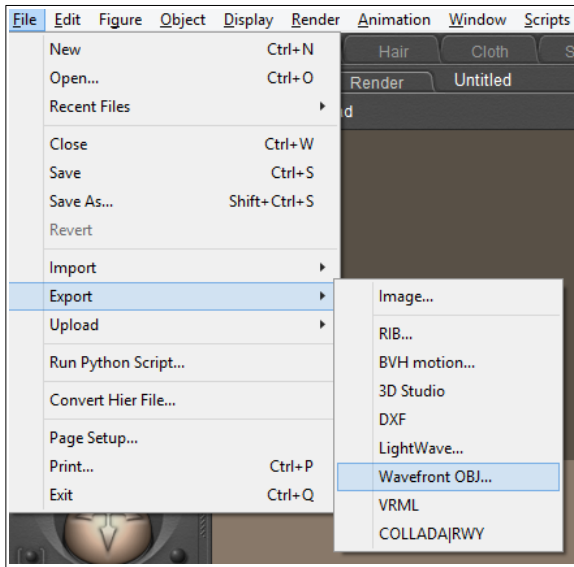
The purpose of exporting a Poser character as an OBJ file for creating morph targets is that it provides a fail-safe method for morphing any character in Poser. The down side is that several steps must be performed precisely for it to work properly. Miss one step, and you could end up with the dreaded “Vertex counts do not match” message.

Another downside to this procedure is that extended material information such as displacement maps, etc. will be lost, and will have to be setup manually if required.

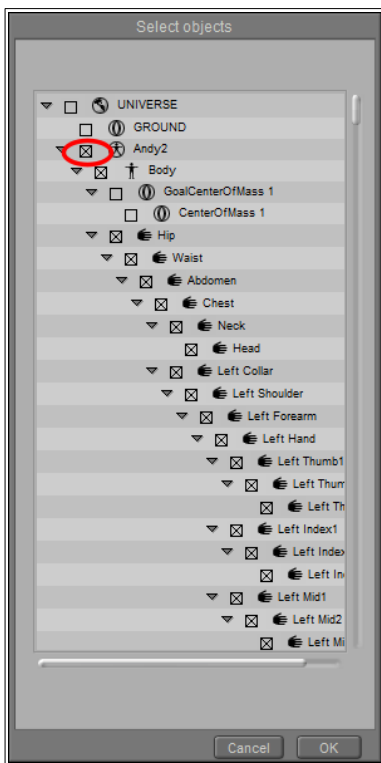
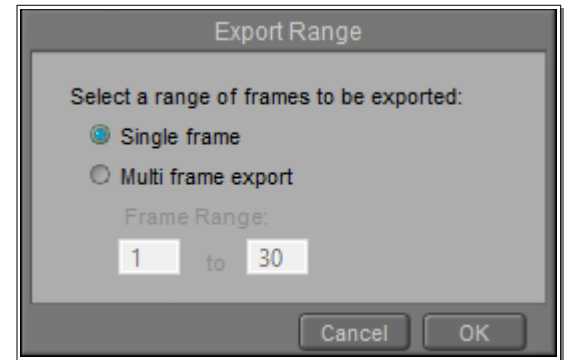
First, let's export the character from Poser as an OBJ. For this example, we will use the **Andy2** character which is Poser 10's default. It is important to note that this procedure will work for any character ( again, if done precisely ).

*Note, please be sure to update to v6.0.2.0 or later, otherwise you will encounter a bug with the vertex welding.*





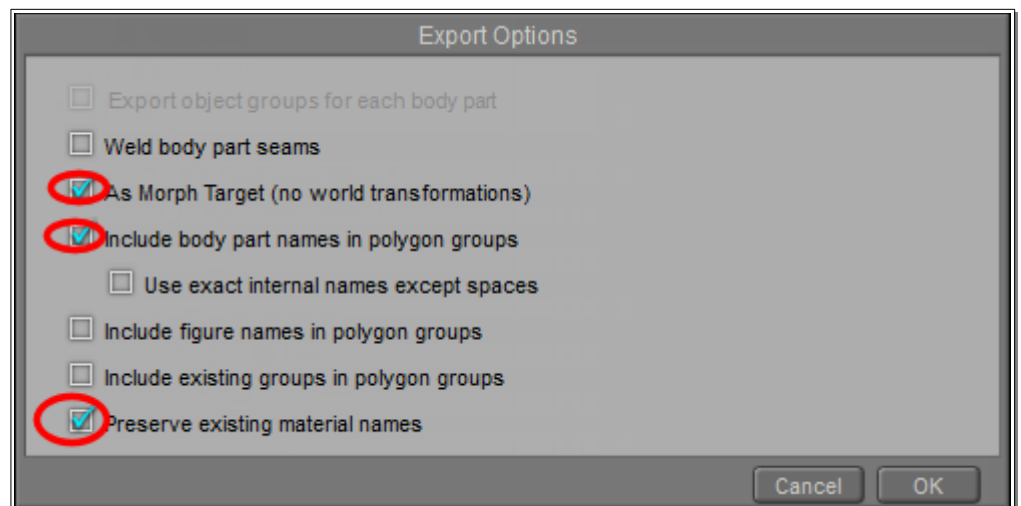
With Poser open and the character present in the scene, click **Menu-File-Export**. In the next window, choose **Single Frame** and click OK.



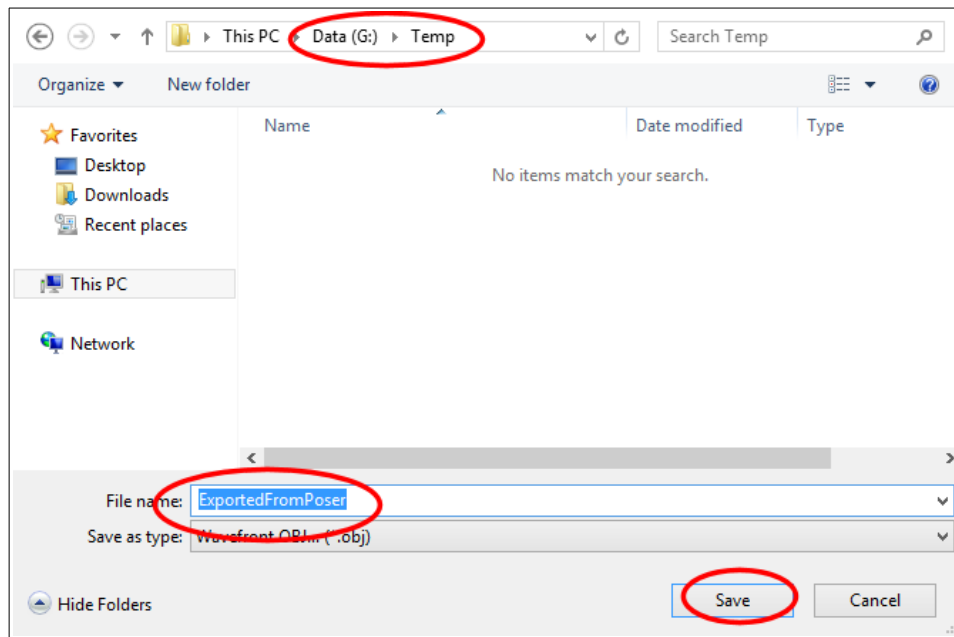
On the next window, make sure that the character you want to export has an **X** in front of it, and no other objects do. Do not uncheck any of the child body parts, just make sure that no other objects ( e.g. the **GROUND** object ) are checked.

When presented with the export options, please **UNCHECK** everything except the following options...

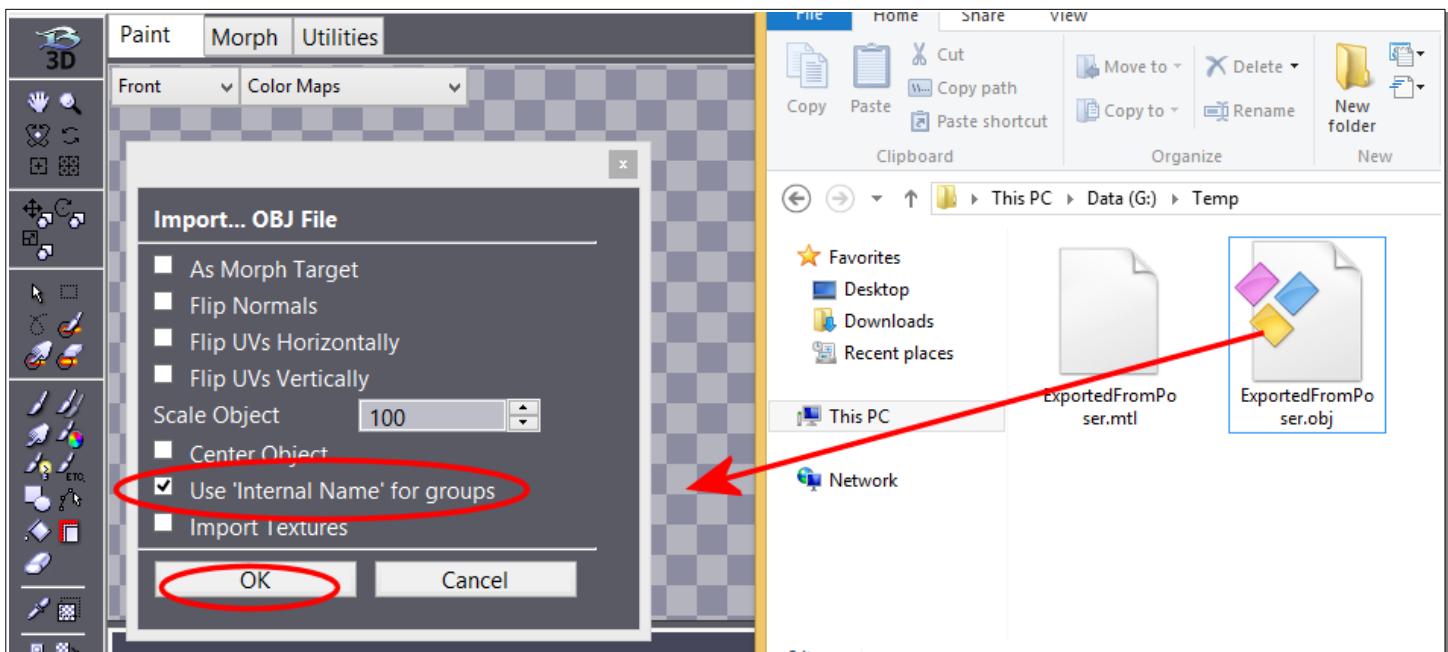
- As Morph Target ( no world transformations )
- Include body part names in polygon groups
- Preserve existing material names



When prompted, save the OBJ as **ExportedFromPoser.obj** to a temporary folder with nothing else in it ( to keep things tidy and to avoid confusion ).



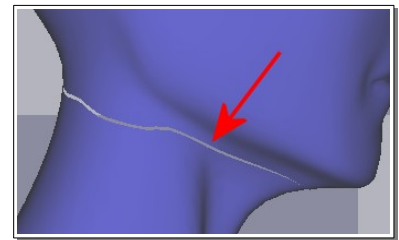
Now, the next step is to import the file into Blacksmith3D. Simply drag and drop **ExportedFromPoser.obj** into the viewport of Blacksmith3D. You will then be presented with the import options.



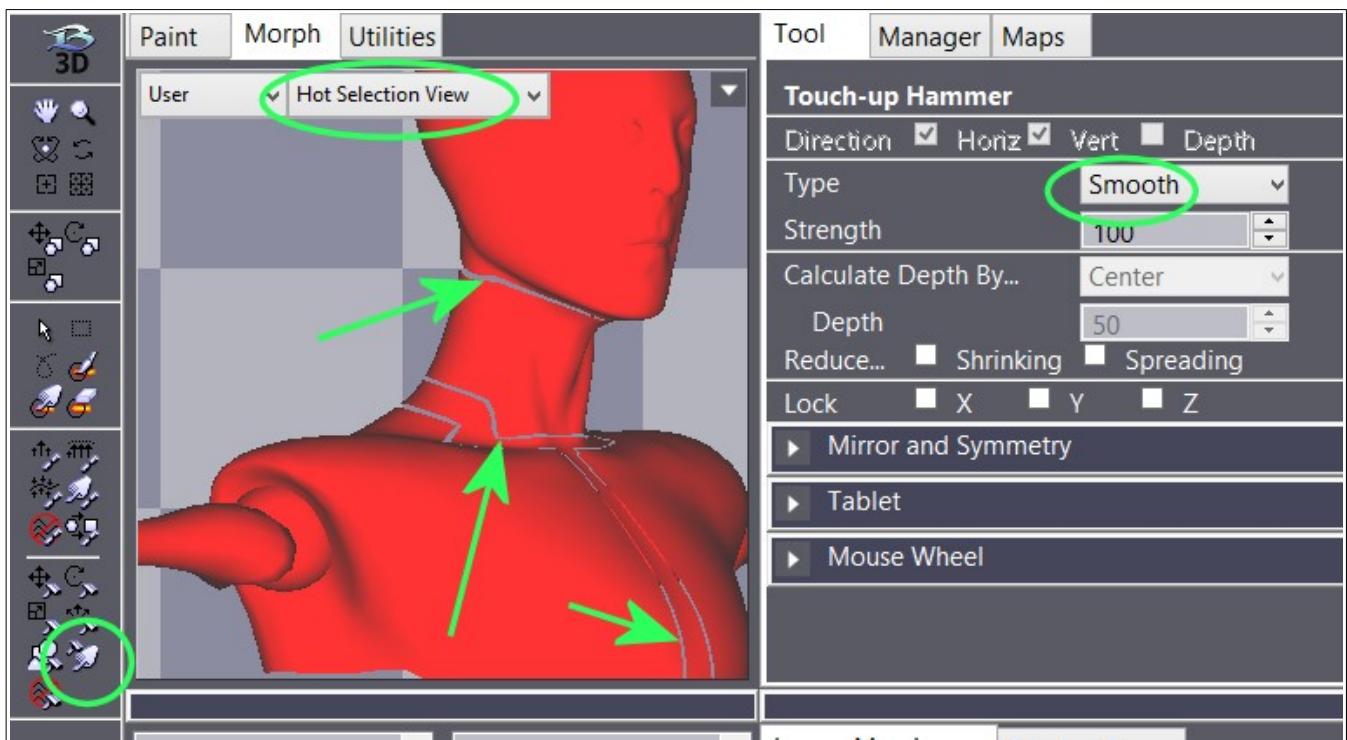
When we exported the OBJ without the **Weld body part seams**, Poser will chop the original object up so each body part is detached from the others. This is the source of most of the confusion when making morph targets for Poser via OBJ files. But for Blacksmith3D to create morphs that can be imported back into Poser, we **MUST** do it this way.

However, having all of those **seams** in the mesh are not desirable for morphing projects, especially if they span multiple body parts. This is why Blacksmith3D has a temporary welding tool, that can weld those seams together, and unweld them when we are finished.

For this model in particular, the seam at the neck-head intersection is very obvious and will require some special considerations that we will address shortly. This issue has to do with how the original object was created, and is not the result of any bug in Poser or Blacksmith3D.

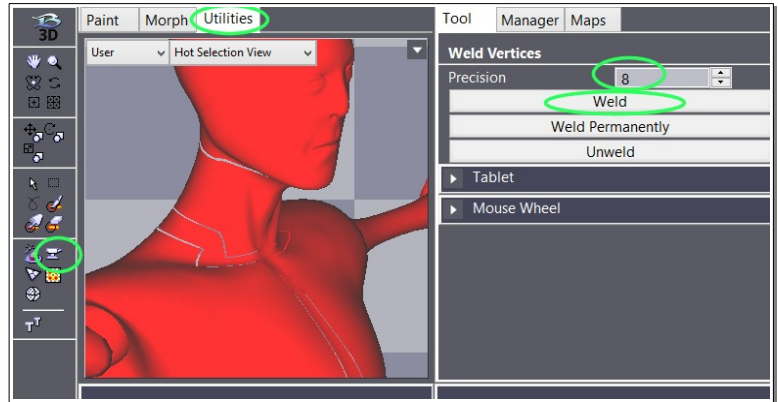


First, to make it easier to see the seams, press **CTRL-A** to select the whole object. Then choose the **Touch-up Hammer**, and then choose the type **Smooth**. Click and drag in the viewport until the seams come apart just enough for us to see them.



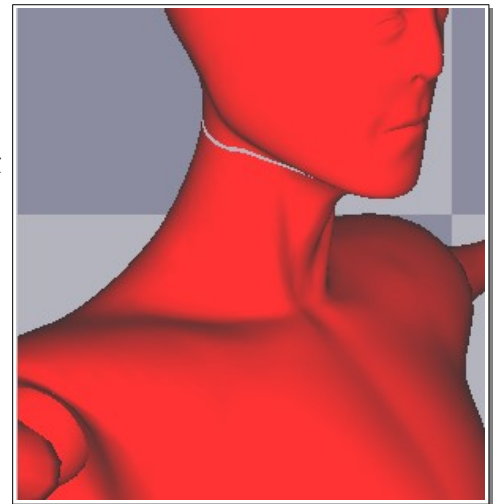


Now, click on the **Utilities** tab, and then choose the **Weld Vertices** tool. Note the precision value in the **Tool** panel. The default number 8 means that the welding calculations will be precise to 8 decimal places, assuming the dimensions of the object are {1,1,1}.



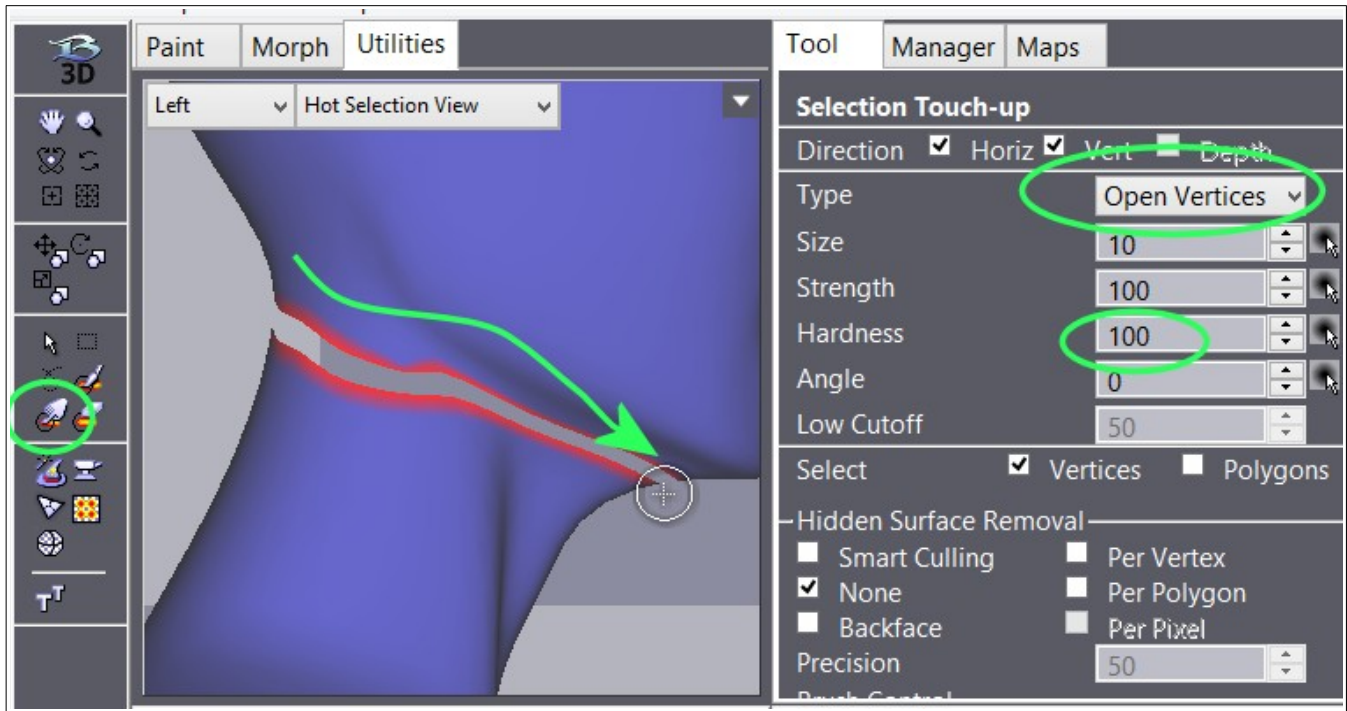
Anyway, just know that a higher number is **more precise, but less forgiving**, and a lower number is **less precise, but more forgiving**. This is important for dealing with the head-neck issue we mentioned above.

Set the **precision** value to 8 ( if it is not already ) and then click **Weld**. You will notice that all of the seams except the neck have now been welded. Also notice that the fact that we **smoothed** the surface of the model did not affect our ability to weld. Blacksmith3D uses the **un-deformed** vertices for the welding calculations. We smoothed the model only so we can **see the seams easily**.

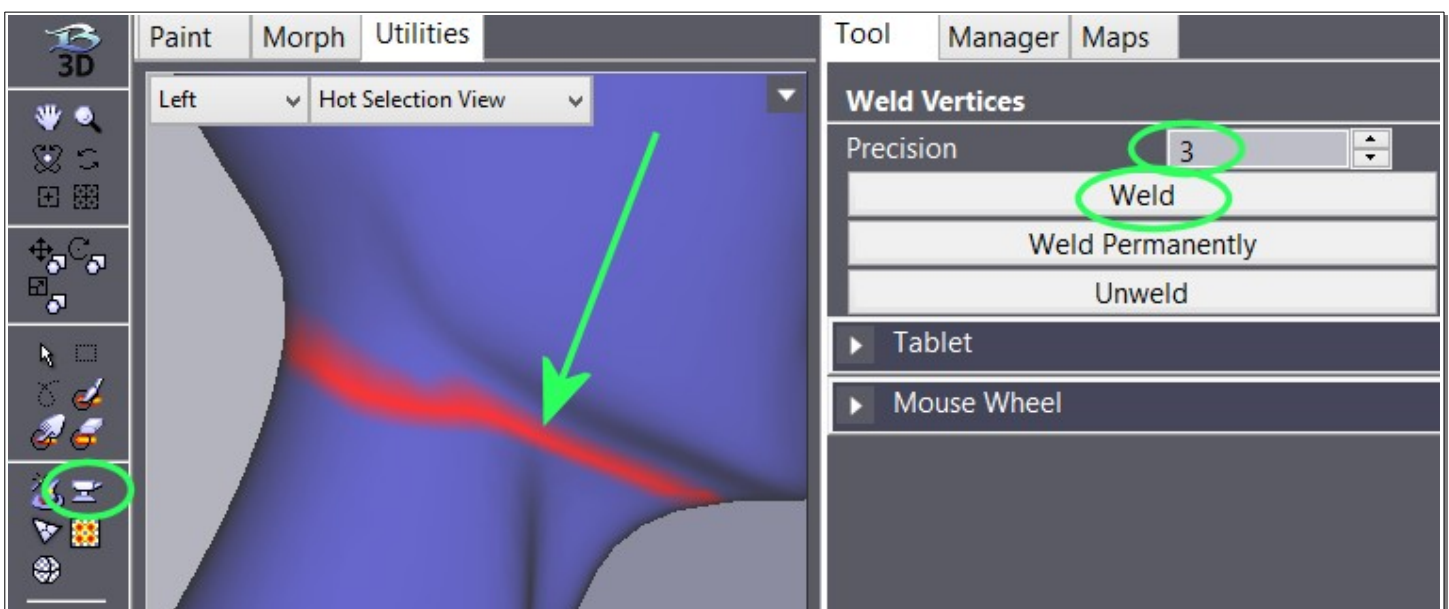


Now, let's address the head-neck seam. To do this, we will use the **Selection Touch-up** tool and set the type to **Open Vertices**. Set the **Hidden Surface Removal** set to **None** so our selection will go straight through the object.

Press the **LEFT** arrow key to view the model from the left side, adjust the position if necessary, and click and drag the selection brush. Make sure you get all of the vertices on the open edge. You may also want to set **Hardness** to 100%.



Now, choose the **Weld Vertices** tool again, set the precision to 3, and then click **Weld** again. Notice how the neck seam has now gone away.

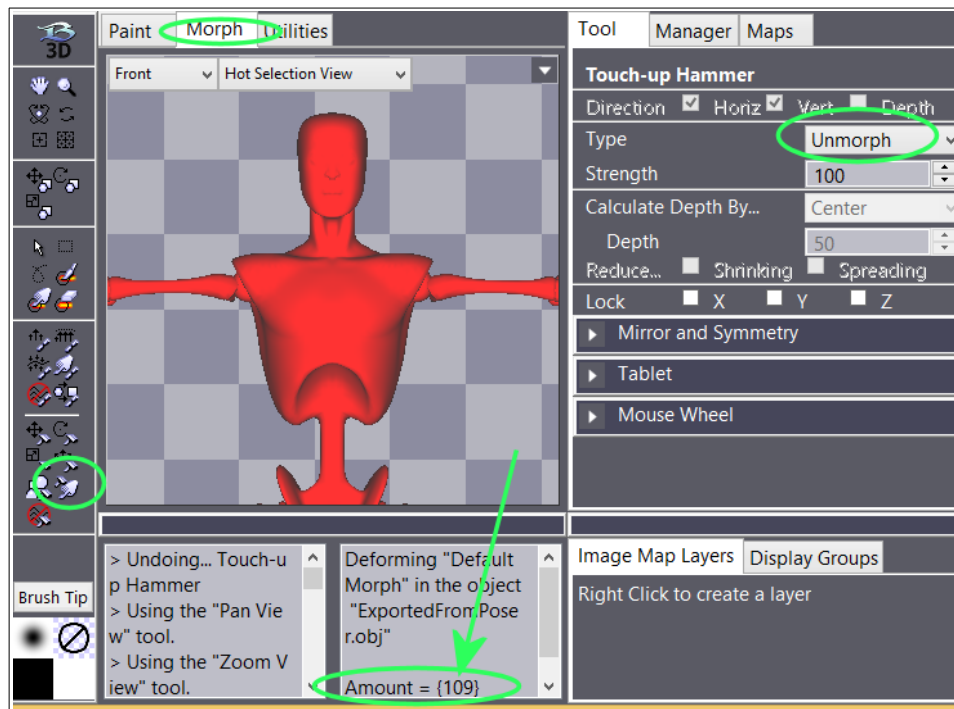


You may now ask the question, “Why did I not just use the precision value of 3 for the whole object?”. Well, the answer to that is that it may have resulted in bad welding, where vertices that are close together, but not meant to be a matching pair, may get welded together by accident. By only using the low precision value on the open vertices of the neck, you can minimize that risk.

Also, you may not want to jump directly to the value 3. For other objects, you may want to try progressively lower values from 8 ( e.g. 7, 6, 5... ) until you find the highest number that welds the seam completely.

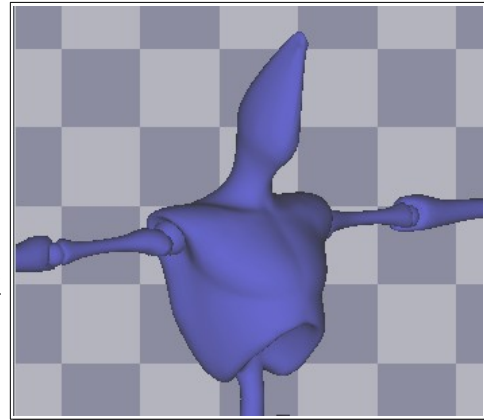
### *Undoing the Smoothing*

Now that the seams have been welded, you should immediately get rid of the smoothing deformation. It was only there to help us see the seams more clearly. You can either delete the current morph ( Default Morph ) from the manager and then create a new one, or use the **Touch-up Hammer** with the type set to **Unmorph** it. For this tutorial, we will choose the later... So, click on the **Morph** tab, choose the **Touch-up Hammer** and set the type to **Unmorph**. Then press CTRL-A to select everything, and then click and drag in the viewport until all of the smoothing has gone away. Note the **Amount** value in the message window should be 100 or greater to completely unmorph the smoothing.

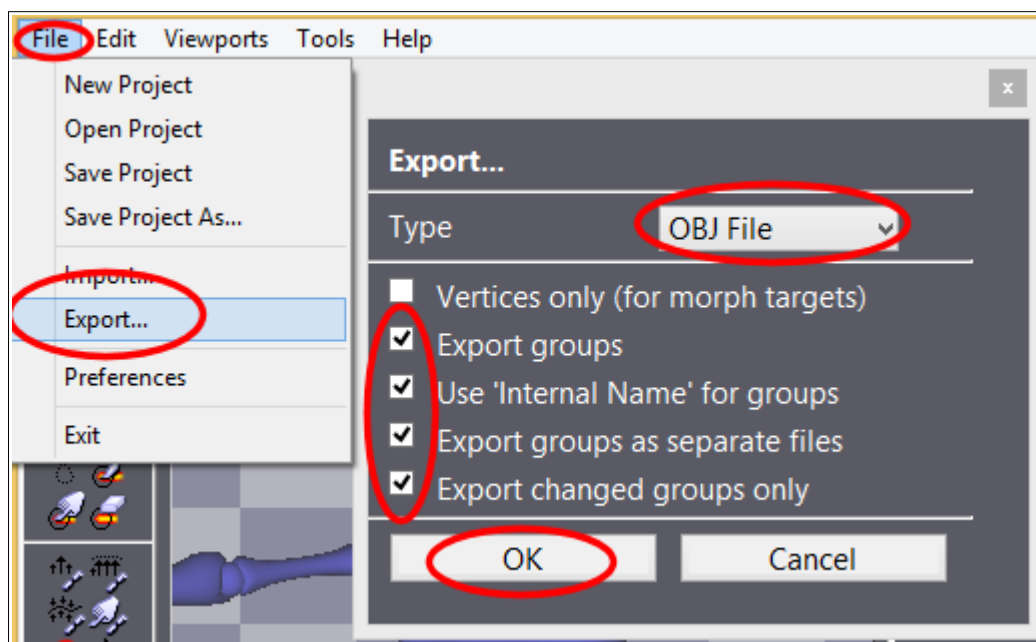


Your character is now ready to be morphed in Blacksmith3D in such a way that it will be in sync with Poser. If this is a character that you will want to use as the basis for many projects, you should save the project in this state for future use ( e.g. My-Character-Setup-To-Morph.blacksmith3d ).

We will not get into the specifics about **how** to make morph targets. That is the topic of other tutorials ( see **Morphing** tutorials ). Here we show a simple morph that spans over the head, neck and parts of the chest. The rest of the tutorial will show you how to get the results back into Poser.



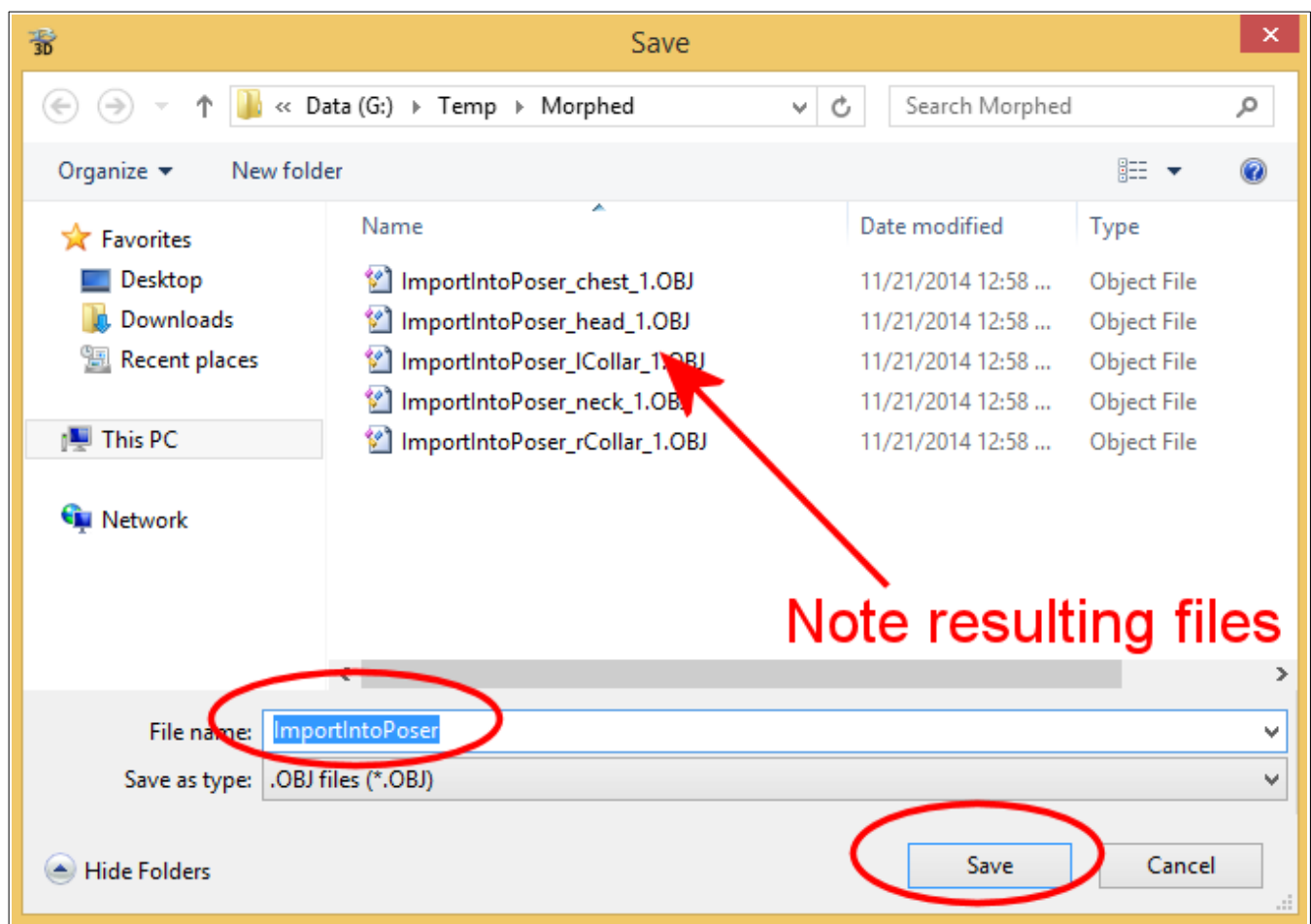
Click on **Menu-File-Export**, and then choose the **OBJ** type. Set the export options to include **Export Groups**, **Use 'Internal Name' for groups**, **Export groups as separate files**, and **export changed groups only**.



The last two options are very important especially. **Export groups as separate files**, and **export changed groups only** will export each body part as a separate object, which can then be imported into Poser as a morph target. It has been especially designed to keep the **vertices in sync**, so it is important that you have followed the previous export/import steps precisely.

Click on OK, and then choose a path and file name to export to. **We highly recommend that you save to an empty folder**, since many files can be generated, and it can easily get confusing if there are other files in there as well, so it is best to keep things tidy.

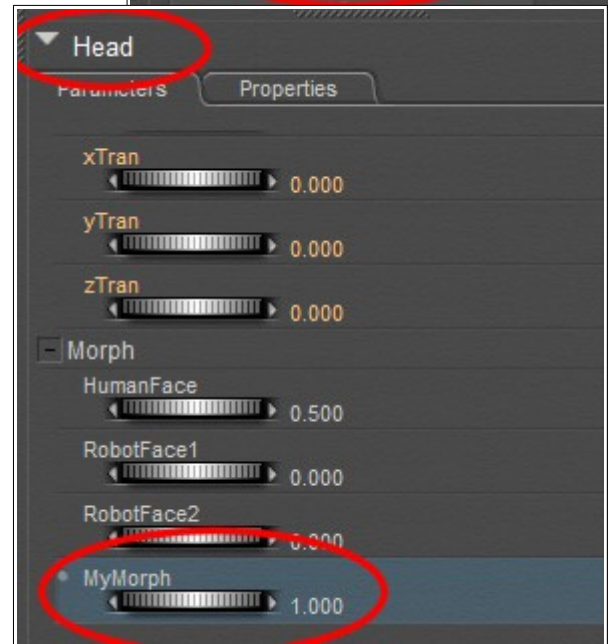
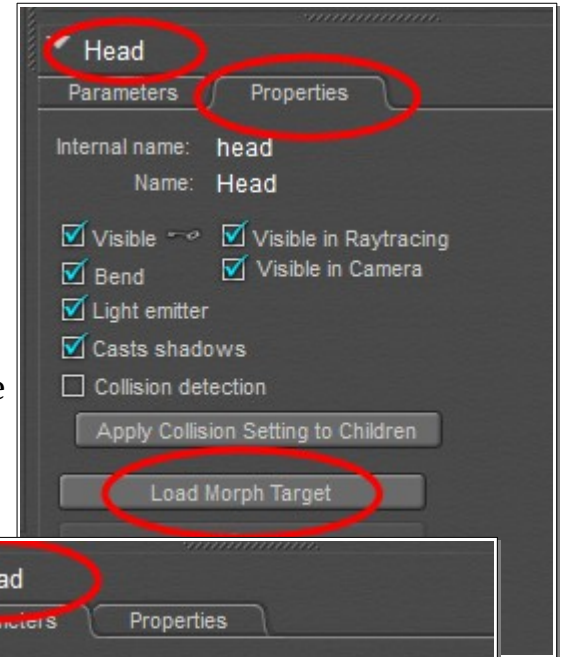
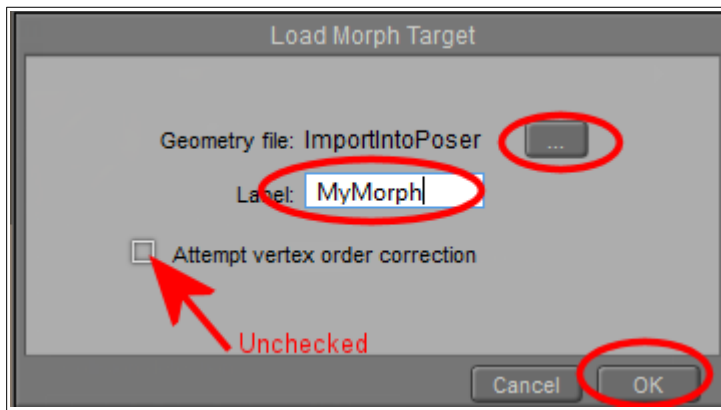
Here we chose the file name **ImportIntoPoser**. The result will be several files called **ImportIntoPoser\_head.obj**, **ImportIntoPoser\_neck.obj**, etc.





Now the morph target is ready to be imported into Poser. Inside Poser, with the same character already loaded, start off by clicking on the head to make it active, click on the **Properties** tab, and then click on **Load Morph Target**.

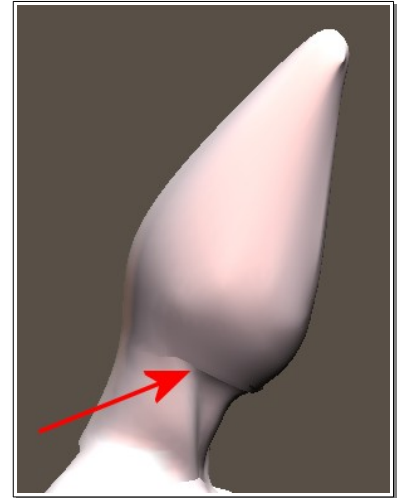
Click on the button next to **Geometry File** and then locate the file **ImportIntoPoser\_head.obj** ( or whatever it is. There may be a number attached to the end of head, etc. ).



Then change the label to **MyMorph**, and then click on OK. Make sure that **Attempt vertex order correction** is NOT checked, since we already took several steps to ensure that the vertices will be in sync.

You will now see the new morph appearing in the **Parameters** tab. Set the strength to 1.0 to apply the morph and see the result in the viewport.

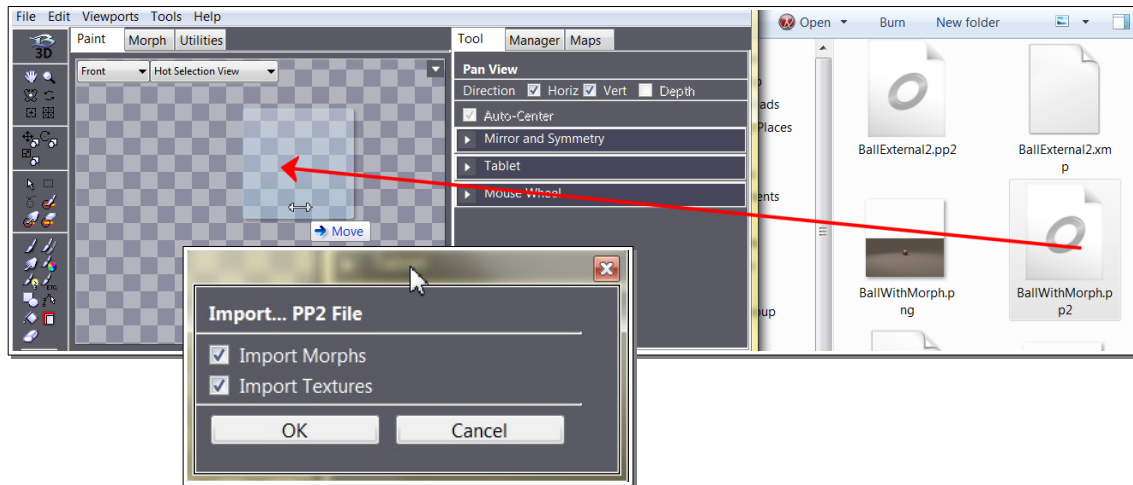
You will now notice the hard edge between the head and the neck. You will need to repeat the exact same procedure, by clicking on the neck, and then importing it's morph target, and finally setting it's strength to 1.0.



This completes the procedure for creating morph targets for Poser via OBJ file import/export. Although it is much easier to simply use a CR2 import/export, it will only work for simple character files that have a single object. Sometimes complex CR2 files will not be supported by Blacksmith3D, so the OBJ file work flow is best method to morph just about any character for Poser.

## Importing PP2 Files

To import a PP2 prop file, you can simply drag and drop it into the viewport in the same way as we do for CR2 files. We have the options to import both morphs and/or textures.



As with CR2 files, there are limitations to PP2 imports. Specifically, they are limited to a single object per prop file, and only simple **image\_map** shaders are supported.

Once the prop has been imported, it can be edited in the same way as any other object, and you can export the painted image map files, or re-export it as an OBJ.

If for whatever reason the PP2 file is not supported by Blacksmith3D, then please export the file from Poser as an OBJ file.

## Importing DUF Files

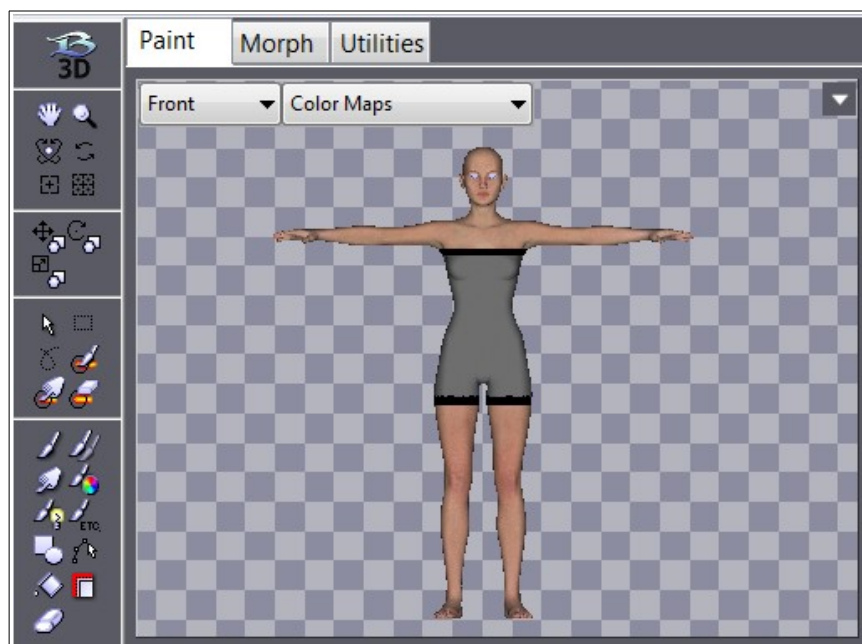
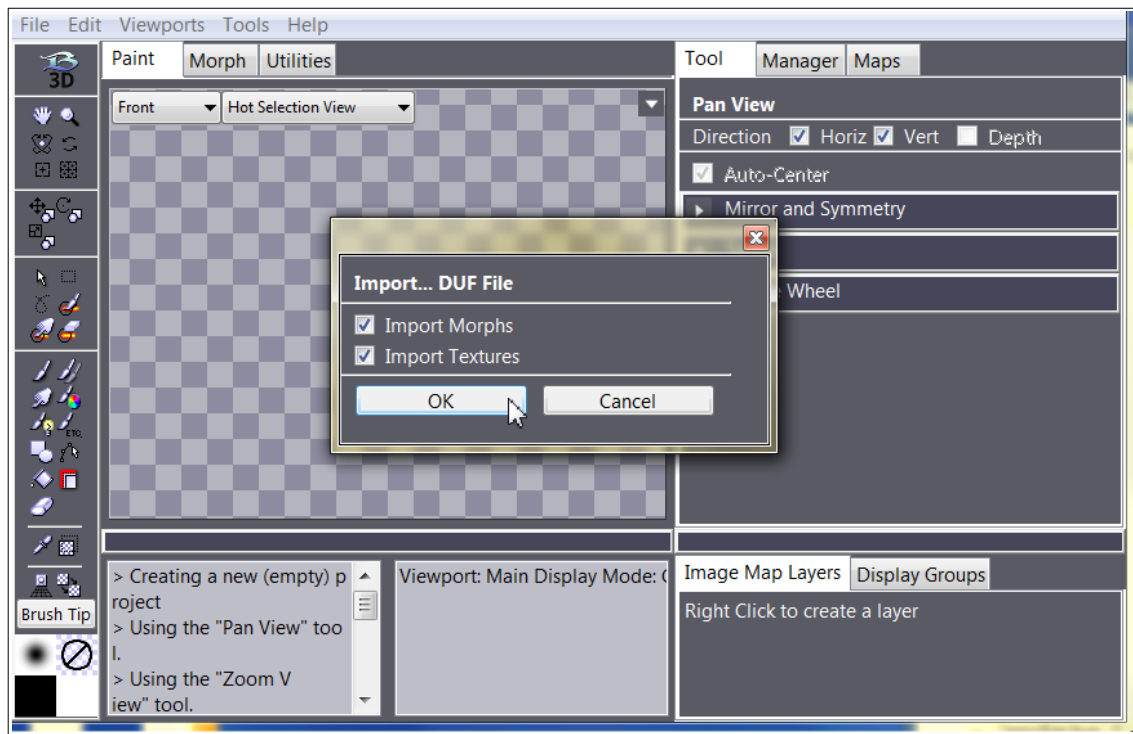
Blacksmith3D now supports importing DUF scene files ( important... only **Scene** files ). It can import multiple objects that may be contained in DUF scene file, although for most projects, you'll want to limit this to a single character to keep things easy to manage.

Due to the complexity of DUF projects, not all files may be supported. Generally, simple objects and characters without complex material shaders should import properly. In the event of a specific character not importing 100% properly, then exporting it from DAZ Studio as an OBJ and manually assigning the desired textures is the fail safe method.

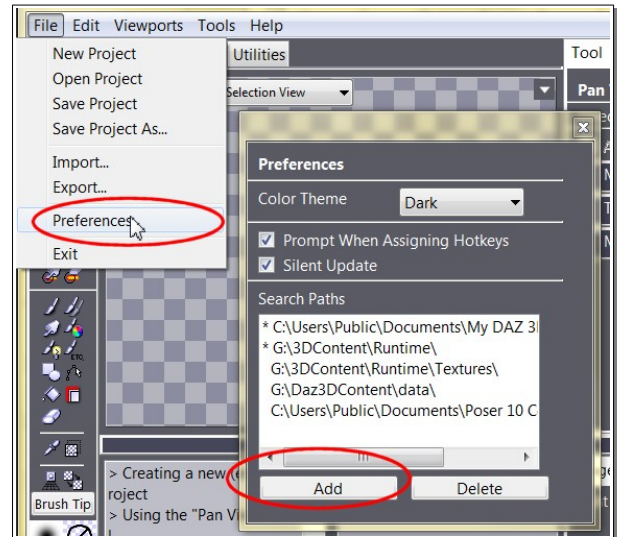
Likewise, if Blacksmith3D does not recognize certain morph targets ( as they may be

advanced controllers managing multiple morph targets behind the scenes ), you can export the morphed character as an OBJ from DAZ Studio, and import it as as morph into Blacksmith3D.

With that being said, in DAZ studio, load the character that you wish to edit in an empty project, and then save the scene ( DUF ) file. To import the DUF file into Blacksmith3D, simply drag and drop it into the viewport, check **Import Morphs** and **Import Textures** and then click OK.



It is very important to note that DUF files will often refer to other files that are in the DAZ Studio library. To be able to locate these files automatically, you should add the library ( or libraries ) to the search paths before importing. Do do this, choose **Menu-Preferences**, and then click the **Add** button to add a search path. For more information, please see **Preferences**.



You can now edit the object as you would any other inside Blacksmith3D. When it comes time to export the results, it is recommended that you do so in the following ways...

- For textures, export your textures back to DAZ Studio is via the MAT file export. Check the **Export All Maps and MAT to Runtime** and choose a Runtime folder. DAZ Studio will be able to import the MAT file and make all of the material-map associations, saving you from having to set them up manually.
- For morph targets, export the character as an OBJ file morphed as desired, and then use DAZ Studio's **Morph Loader** to import the OBJ as a morph target for the desired character. This is the easiest and most direct way of getting the morph back into DAZ Studio.



## Importing and Exporting FBX Files

Blacksmith3D can import and export FBX files using the 2015 SDK. It should have little or no difficulty reading FBX files created with previous versions ( e.g 2014, 2013, etc. ). When exporting back to the host application, it may or may not be up to date with the latest SDK from Autodesk ( 2015 ), so this is something to watch out for.

Blacksmith3D utilized an **injection** technique to export FBX files where the original FBX file that is loaded is re-loaded first, and then only the **changes** are applied to the objects ( e.g. Morphs, Textures and UV maps ), and then resaved. In this way, advanced features like rigging, lighting, etc. can be preserved without Blacksmith3D having to **reinterpret** them. They will be the same as they were in the original FBX file exported from your host application, except for the changes.

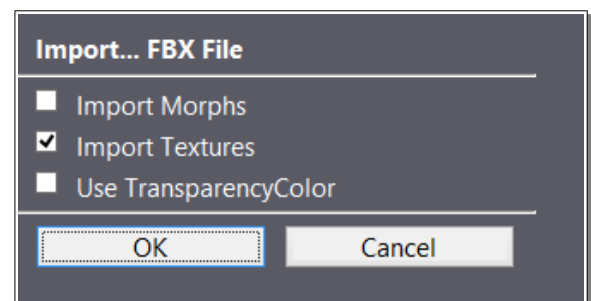
With that being said, not all software applications will export/import FBX files consistently in themselves. For example, Poser Pro can export an FBX file with rigging, but if you choose to re-import that file, it's rigging will not be consistent with the original. So, if your work-flow depends on a **round trip** via FBX files, then do a few tests exporting and re-importing the FBX file ( without modification by Blacksmith3D ) to see if it works in your situation.

In MOST cases, you will probably want to import a FBX file, but then only export the edited results ( texture maps, morph target as an OBJ, etc. ). You should only depend on a **round trip** solution if you have first tested it thoroughly and can be sure that no information is lost in the import/export process.

### Importing FBX files

You can import a FBX file by dragging and dropping it into the main viewport. The **Import Morphs** and **Import Textures** options should be self evident at this point. The **Use** **TransparentColor** option helps you to preserve the transparency map setting in a way that is consistent with your host application. Some

applications will store the strength of the transparency ( or opacity map ) in the **TransparencyFactor** setting while others will use the **TransparencyColor** setting. To find out which one is applicable to the platform you are using, load a simple object into your host application ( e.g. 3D Studio Max, Maya, Poser, DAZ Studio ), assign a



transparency map, and give it a unique strength value, say, 65%. If it's labeled as **opacity** in the interface, then you may enter 35% instead ( 100% - 65% ). Then export the file as an ascii FBX file. Load the file into a text editor and locate the material in question. If the transparency map strength value appears in the **TransparencyFactor** field, then leave the **Use TransparentColor** unchecked. If it appears in the **TransparentColor field** ( usually 3 times for RGB values ), then check the **Use TransparentColor** option when importing into Blacksmith3D.

### *Exporting FBX Files*

When it comes time to export the FBX file, you have the usual **Export Morphs** and **Export Textures** options. Also, the **Use TransparentColor** is presented again. Be sure to use the same setting as you used when importing the FBX file to keep things consistent.

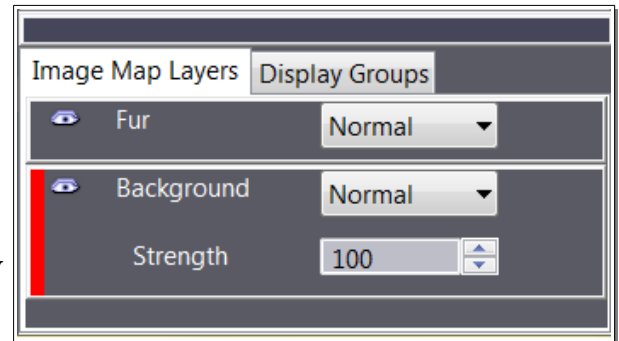
The **Inject changes back into original FBX** option was discussed at the beginning of this section. It will re-load the original file, inject the changes, and then resave the file, preserving the advanced settings like rigging, etc. If the original file cannot be automatically located, you will be prompted to find the file.

Finally, the **Format** allows you to switch between **binary** and **ascii** files, and has options to export the older FBX 6.0 format. If you are having compatibility problems with your host application, then exporting as FBX 6.0 may solve the problem, however, some information may get lost in the process. Always, always perform a few round trip tests with simple modifications ( e.g. quick morph and texture edit ) before doing a large scale project, only to find out that technical issues with the FBX format are holding you back.

## Using Image Map Layers and Display Groups

In Blacksmith3D, you can create and edit Image Map layers, much like you would in your favorite 2D painting application. They can help you create an manager elaborate texture compositions, but they can also consume a lot of system resources.

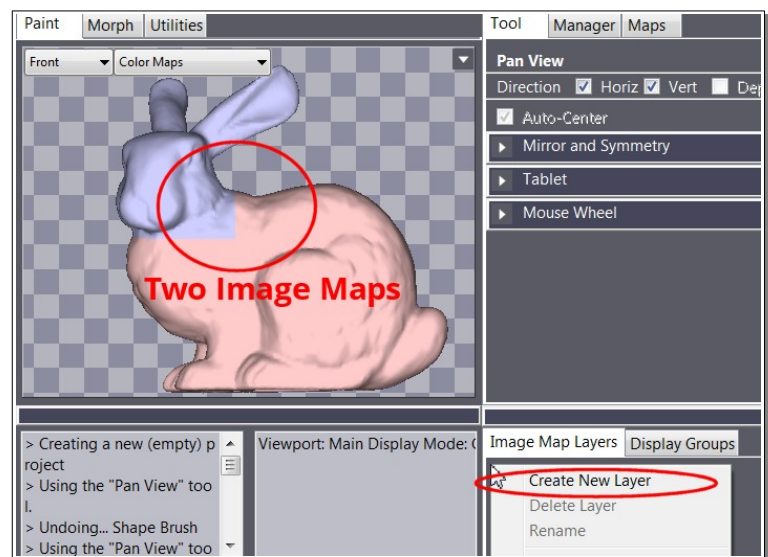
Please be mindful of the memory usage if you are using multiple high resolution textures with many layers. When doing so, it is often useful to purge your project of all textures that are not being edited ( e.g. bump maps, etc. ), and to import/export them as needed. If you have many high resolution maps with many layers, you will certainly run into performance issues.

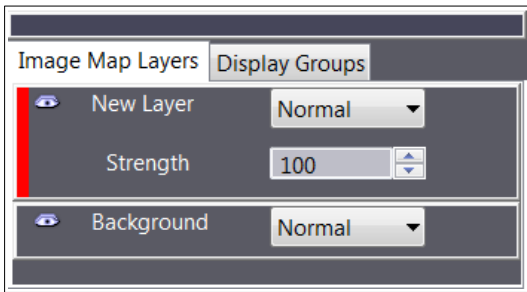


Display groups are similar to **Image Map Layers**, except they consist of **polygons** and not **pixels**. They are mainly used for utility functionality, such as locking and hiding portions of the surface. Their effects won't be evident in your final result, but they will make your life a lot easier while creating it.

## Creating and Editing Image Map Layers

Load the project **Textured-Bunny-Multi.blacksmith3d**. Notice how there are two texture maps. Normally when working in a 2D application, these two maps would be completely separate, with their own layers, etc. In Blacksmith3D, the layers work across **all maps**, so you do not have to distinguish between them. You can paint across multiple maps with multiple layers, as if there was only one map.





After loading the project, right click in the **Image Map Layers** tab and choose **Create New Layer**. You will notice that two layers now appear. The background layer is the original map ( as it was before creating the layer ), and the new layer, which we will want to paint additional details onto.

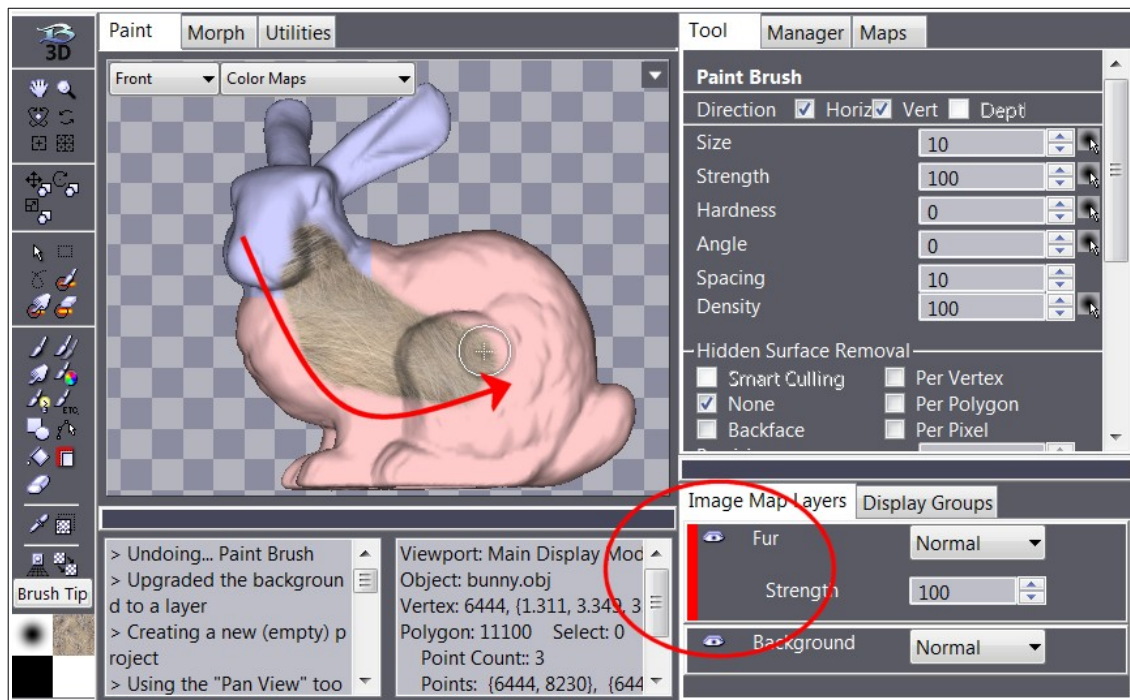
To rename the new layer to something more useful, right click on it and choose **Rename** from the pop-up menu. Enter in **Fur** and then click OK.

Also note that the **current layer** has a red marker in front of it. When managing multiple layers, it can get confusion and you may loose track of what layer you are actually painting on, so pay close attention to this marker.

You can then load in a **Brush Image** by clicking on the icon at the lower right corner of the window and then locating one inside the **03-Leather-and-Fur** folder.

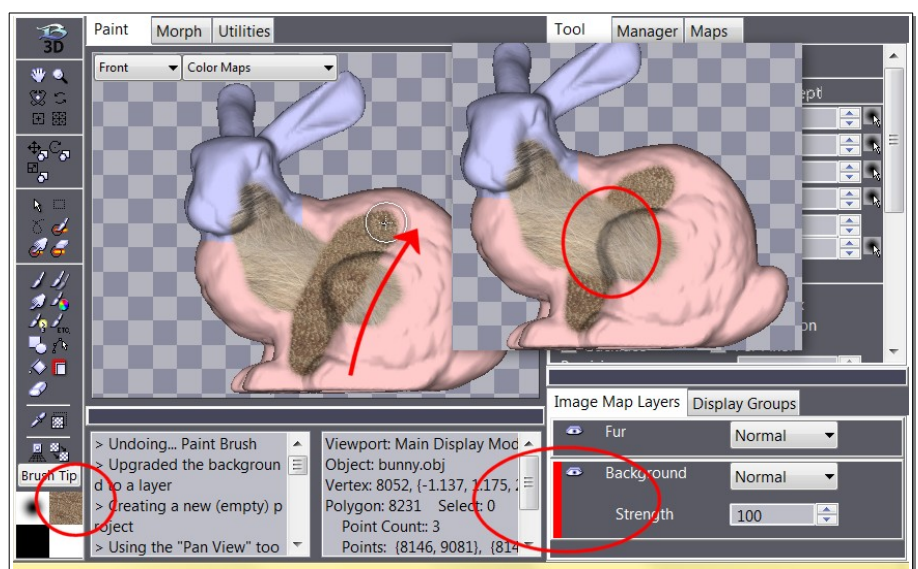


Now, making sure that the **Fur** layer is the current one ( click on it so the red marker appears ), paint a few strokes of the fur texture onto the object.



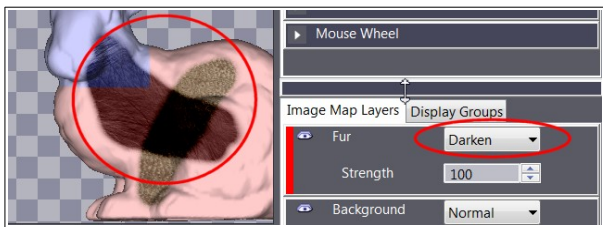
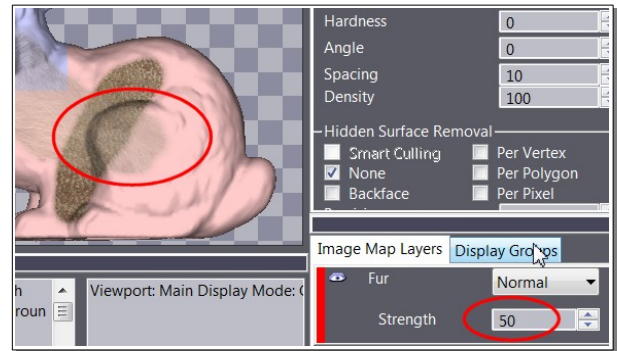
To paint on the background layer, click on it so the red marker appears on it and not on the Fur layer. Also, to help distinguish between which layer we are painting on, change the **Brush Image** to Leather-and-Fur-0009.jpg found in the same folder. Paint another brush stroke in such a way that it overlaps the first brush stroke on the 'Fur' layer.

Notice how when the paint stroke is in progress, it appears **above** the top layer, but when you release the mouse button, it appears **below**. This is normal since the layers do not get fully resolved until **after** the paint stroke.



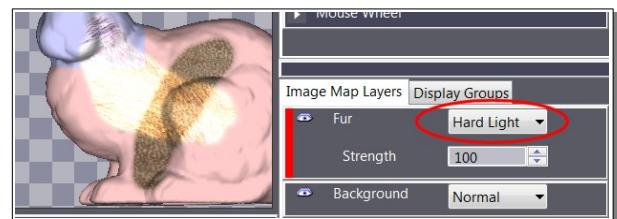


Now, click on the **Fur** layer again, and set the **Strength** to 50%. Notice how it becomes semi-transparent. Changing the strength of a layer is a great way of mixing in **subtle** effects. Then change the strength back to 100%.

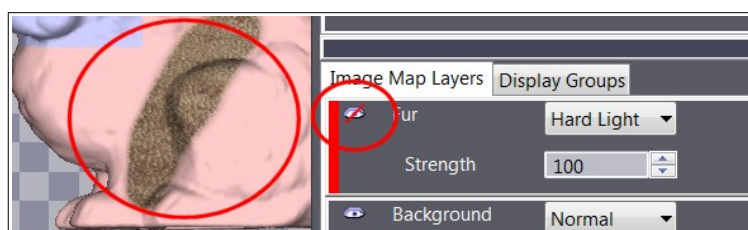
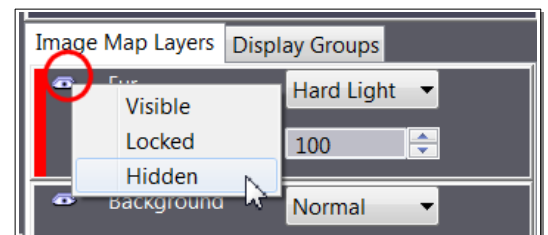


Next, we will change the blending mode. There are many blending modes ( too many to preview all of them here ), but let's take a look at a few of them. Set the blending mode to **Darken** and observe the effect.

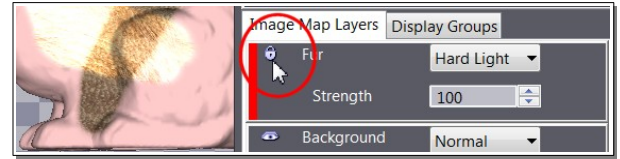
Then, change the blending mode to **Hard Light** and observe the effect. You can now take the time to go through as many of the blending modes and you like to get used to how they look. If you have worked extensively with 2D painting applications, most of these will probably be familiar to you.



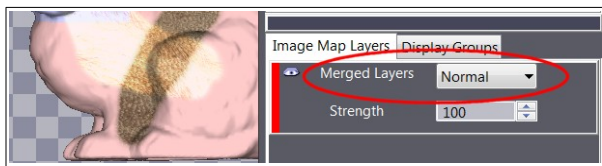
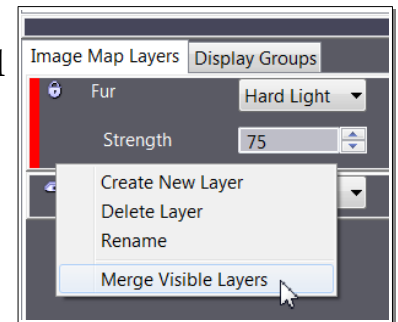
You may have noticed the little “eye” icon on each layer. You can click this icon to toggle between the **Visible**, **Locked** and **Hidden** states. It can operate in one of two ways... you can left-click it to toggle through the states, or you can right click it to choose the state via a pop-up menu. So, **right click** on the layer and choose **Hidden**. Now observe in the viewport how that layer is no longer visible ( as expected ).



Then change the state to **Locked** by clicking on the 'eye' icon twice. Once to toggle it to **Visible**, and once again to toggle it to **Locked**. If you attempt to paint on the layer, you will receive a warning message about the layer being locked and the painting operation will not proceed. Use this option to **protect** layers that you don't want to accidentally edit.



Now, right click on the **Fur** layer to see what operations are available. Create New Layer, Delete Layer and Rename should all be self evident, so let's take a look at Merge Visible layers. This option will take all of the visible layers, and combine them together into a single layer, with their **blending modes** and strength values becoming 'baked' into the result. To emphasize this, set the **Strength** to 75%, then right click and then choose **Merge Visible Layers**.

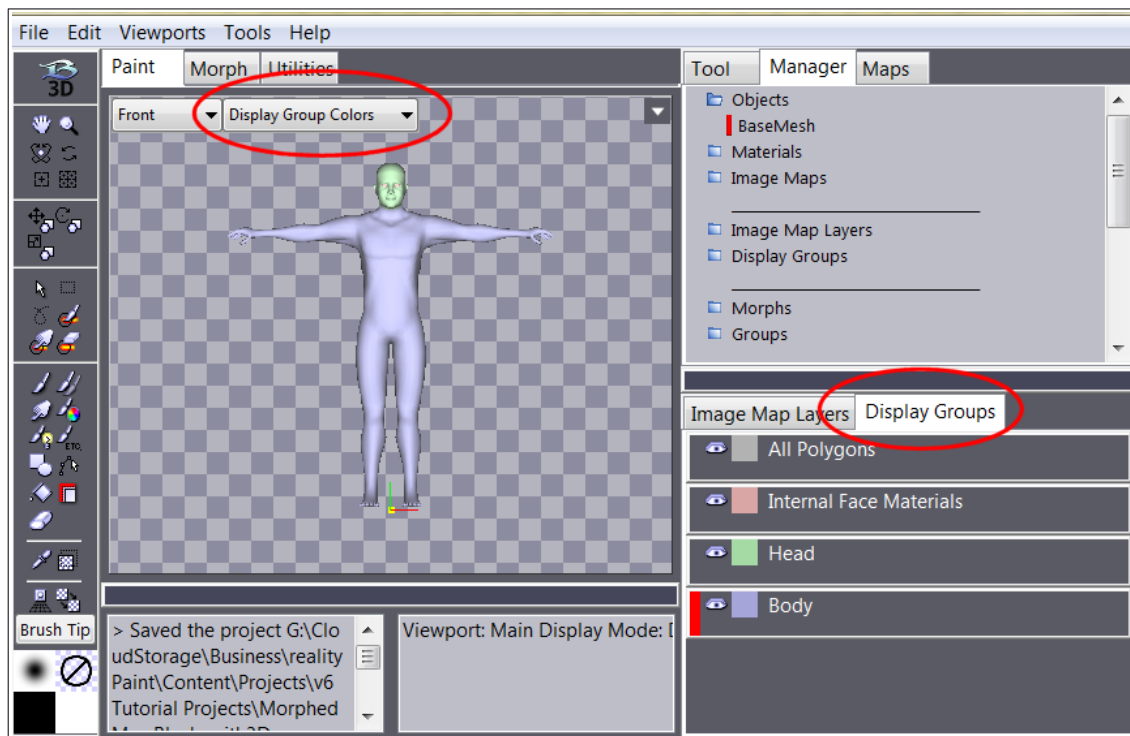


The result is a **single layer** with the effects of the old layers mixed in. Notice how the **Hard Light** effect is still visible in the texture, while the **blending mode** is now normal. Also notice how the **Strength** is 100%, while the appearance of the old 'Fur' layer is still partially transparent. So, in conclusion, **Merge Visible Layers** is a one way trip for combining all of the complex effects of the layers into a single, simple layer.

## Creating and Editing Display Groups

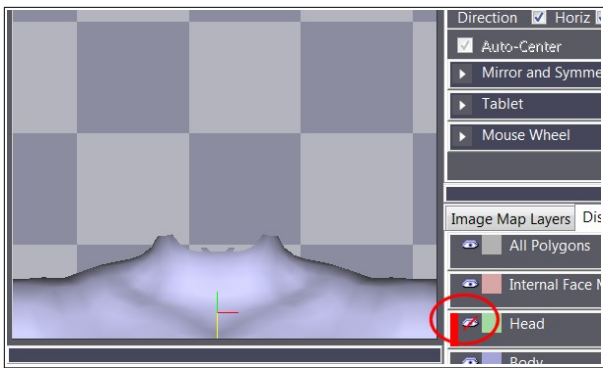
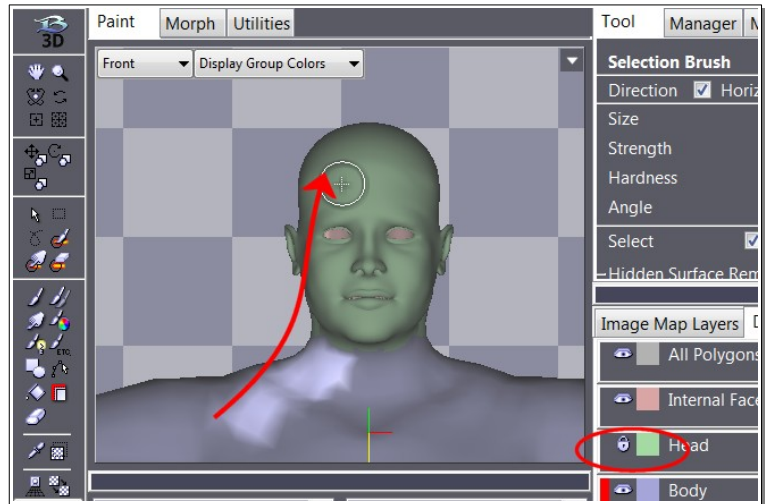
Display Groups help you organize portions of the surface so you can quickly lock or hide them. This is essential for complex models that have hidden geometry ( e.g. inner face geometry for human characters ) and transparent overlays ( such as eye lashes, etc. ) that need to be managed intelligently.

For this example, please load in the project **MorphedMan.Blacksmith3D** . Since we are going to be working with Display Groups right now, change the display mode to **Display Group Colors**. Also, click on the **Display Groups** tab to reveal the existing display groups.



Notice how the color box of each display group corresponds to the color of the surface in the viewport. This makes it easy for us to quickly identify the layers, but have no effect on the final outcome ( e.g. texture colors ).

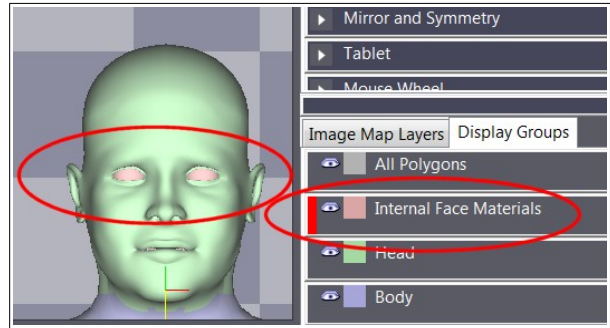
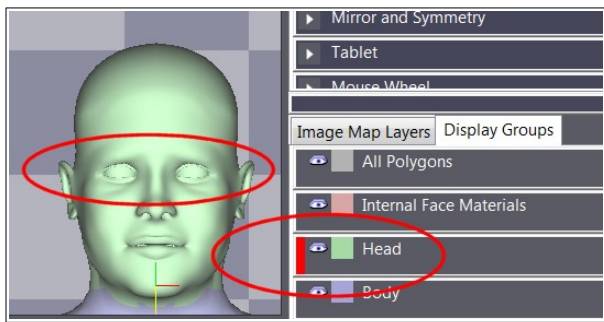
Also notice the 'eye' icon, which we can left click toggle between the **Visible**, **Locked**, and **Hidden** states, or we can right click it to directly set the state that we want. To get a feel for how it works, click the 'eye' icon next to the **Head** layer once. Then choose the selection brush and attempt to select a portion of the head. Notice how nothing happens when you click and drag on the head ( since it is locked ). The 'head' portion of the surface is not only locked for the selection brush, but for paint brushes and deformers as well.



Now, click the 'eye' icon again to **Hide** the head. Notice how it has now become invisible. You can then click it one more time for it to become visible again. You can also right click on the icon to get a pop-up menu, which will allow you to set the layer to any of the three states directly, without toggling through them.

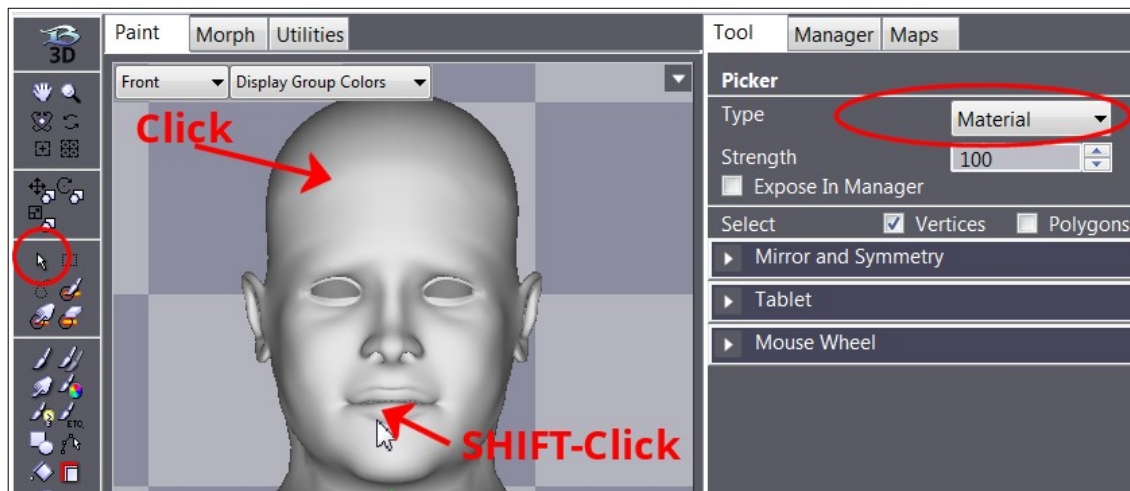
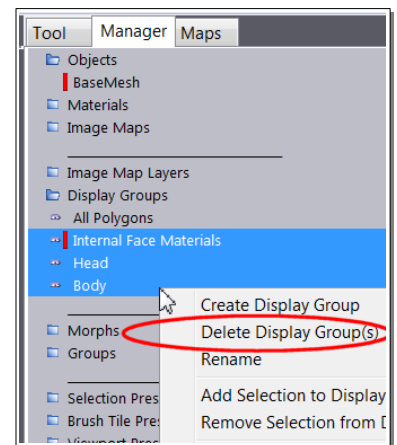
At this point, it's important to note that the same polygons can belong to **multiple display groups**. In this case, we see there is a Display Group called **Internal Face Geometry**. The polygons in that group also belong to the **Head** display group. So, if you lock the **Head** group, you lock the entire head, including the **Inner Face Geometry** parts ( eyes, teeth, etc. ). If you only lock or hide the **Inner Face Geometry**, the rest of the head is still editable.

On that topic, the color ( as displayed in the viewport ) is dependent on which display group is the “current one”, as indicated by the red marker. Since a polygon can belong to more than one group, Blacksmith3D must decide which color to choose, and it will favor the current layer over any other one.



Now that you understand the basic mechanic of using display groups, let's delete the layers and create a few of our own. Right click on each display group ( except **All Polygons** ) and choose delete, or go to the **Manager**, locate the display groups, multi-select them, right click and choose **Delete Display Group(s)**.

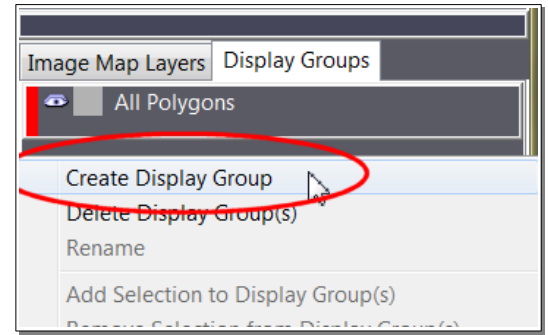
Then choose the **Picker** selection tool and change the **Type** to **Materials**. Click on the head, then hold SHIFT, and click on the lips as well.





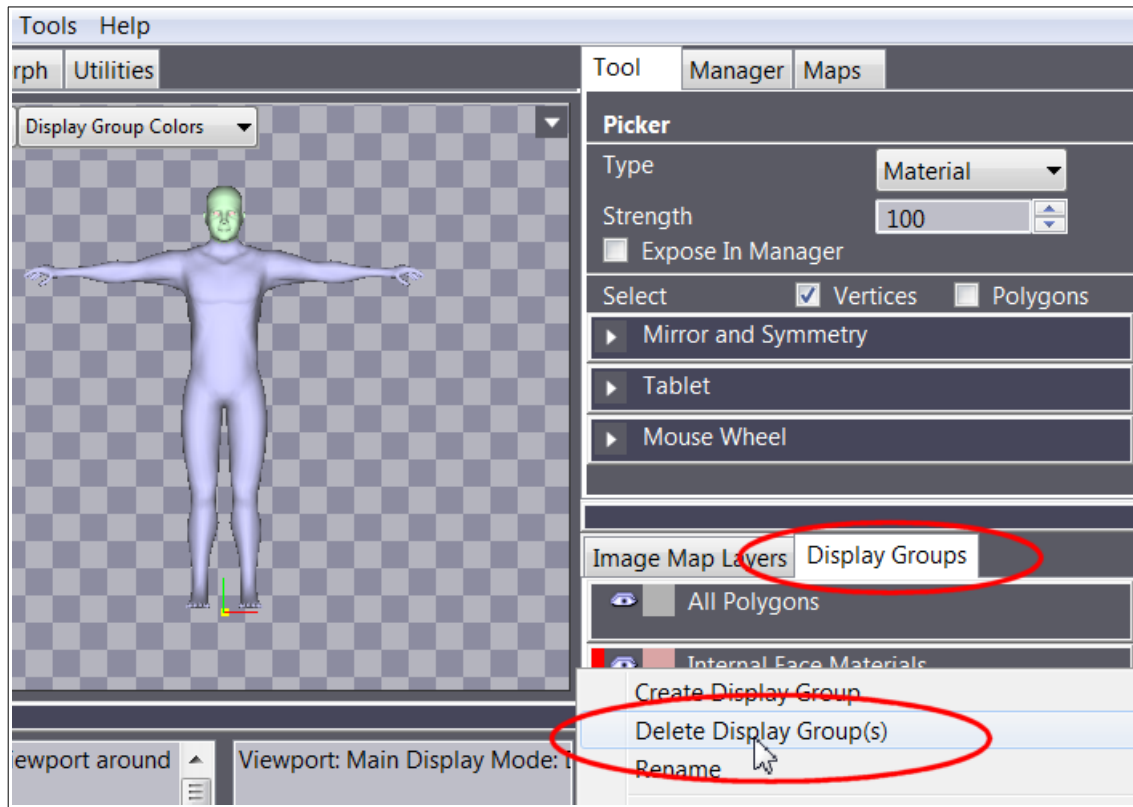
Now, right click in the **Display Groups** tab, and choose **Create Display Group**. A new group will be created with the selected surface being added to it. You can then right click on the newly created display group, choose **Rename** and rename it to “Head”.

You can then repeat the procedure for other portions of the surface. The next tutorial will show you how to auto-create display groups from the **Materials** or **Groups** ( groups as defined in OBJ file ).

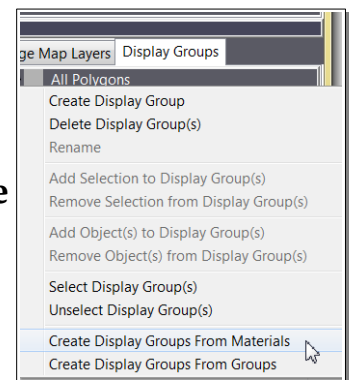


## Creating Display Groups from Materials and Groups

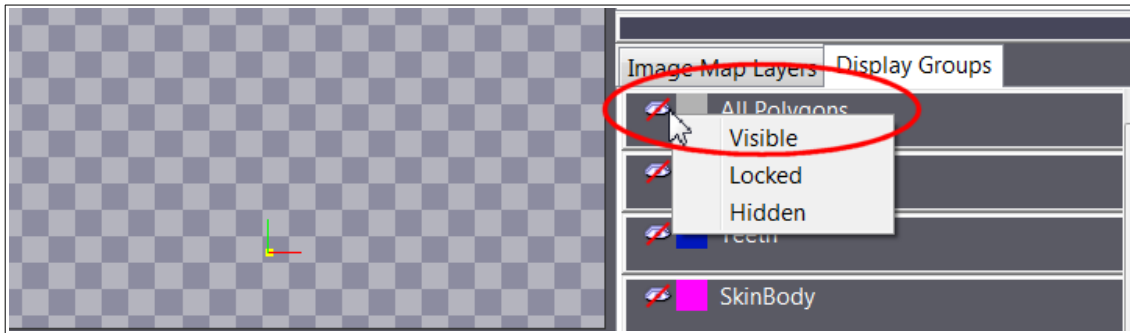
As in the previous tutorial, load the project **MorphedMan.Blacksmith3D**. Then click on the **Display Groups** tab, right click on each display group and delete it so we can start from a clean slate.



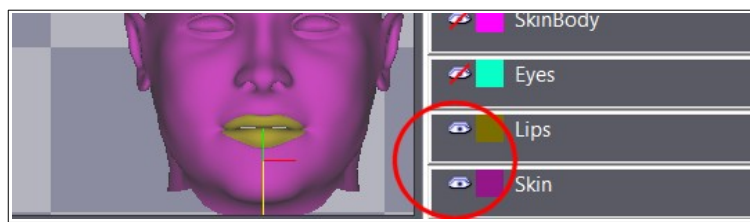
Now, when all you have left is **All Polygons** ( which cannot be deleted ), right click in the **Display Groups** tab and choose **Create Display Groups From Materials**. You will now see many new display groups, one for each material.



You may wish to isolate and edit a single material, or a few together while keeping the rest hidden. The easiest way to do this is to first hide the **All Polygons** layer by clicking on it's eye icon twice, or right clicking on it and choosing **Hidden**.



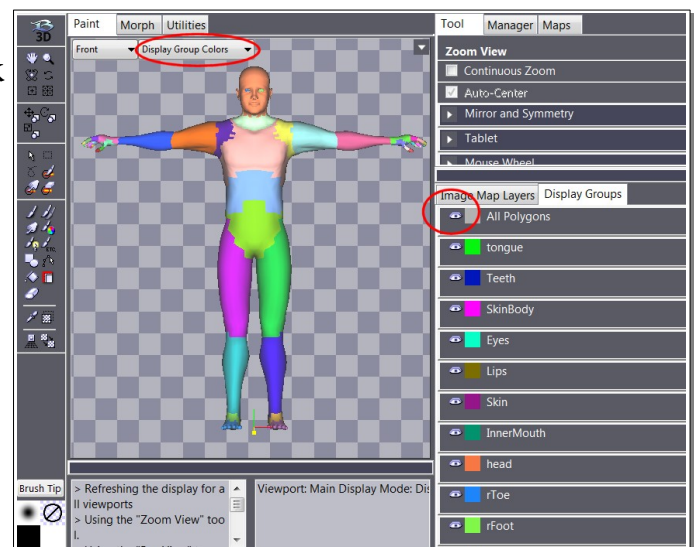
You can then selectively make other display groups visible. Let's make both the **Skin** and **Lips** display groups visible by clicking on their eye icons once each.



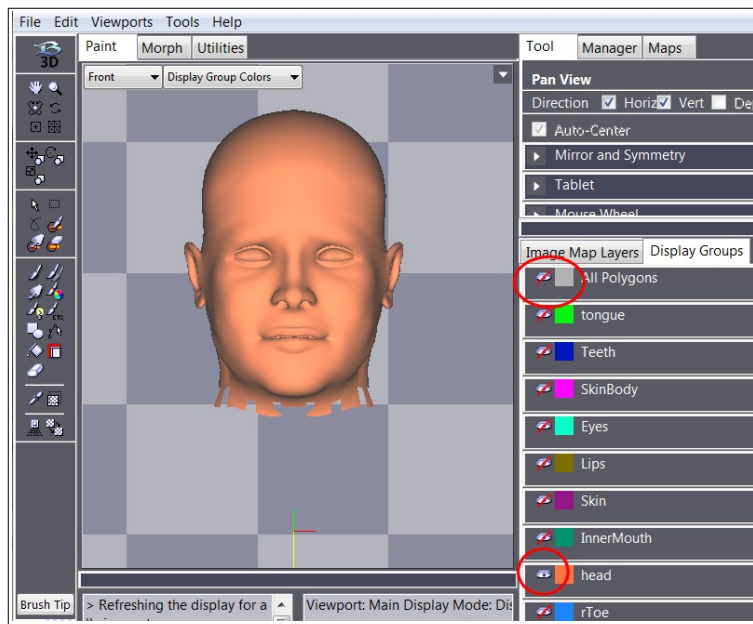
You can now select, paint and/or deform this section of the model in isolation, while the rest of it is hidden away.

Likewise, to create display groups for every group ( as defined in the OBJ file ), right click in the **Display Groups** panel and choose **Create Display Groups From Groups**.

Click on the **All Polygons** display group one more time to make all groups visible again. We can repeat the procedure that we did above to isolate materials, but with groups this time.



Click on the 'eye' icon next to **All Polygons** twice again to hide all of the layers. The locate the **head** display group, and click the eye icon to make it become visible again.



## Creating Texture Transformer Conversion Packages

This tutorial will show you how to create a custom Texture Transformer conversion package. Each package allows the user to transform the textures from one Poser character to another ( e.g. Victoria 4.2 → Dawn ).

This feature is only available with the **Registered** version of **Blacksmith3D-Pro** .

The basic procedure is this...

- The two characters are morphed in such a way that their surfaces overlap as close as possible, with distinctive features being lined up appropriately.
- When the morphing is complete, both models should look nearly identical.
- Inner face geometry such as teeth, eyeballs, etc. should be pulled out of the head and placed in a location where they will not overlay with other surfaces ( e.g. skin ).
- The Texture Transformer will then trace the surface of both morphed characters, and match up the “closest pixel” from one model to another, creating a mapping for transferring textures between the two.
- Special text files are created to guide the Texture Transformer by letting it know the material-map associations, the original OBJ file names ( as they appear inside the CR2 files ), etc.
- A small temporary “dummy” object that is generated from the destination file need to be generated to enable conversions to take place without an actual destination CR2 file. It is called **a01.dat** in the conversion folder ( e.g. V4\_To\_Dawn )

This procedure is not user friendly by any means, and should only be attempted by those with extensive experience in...

- Character morphing/modeling. You should have the ability to to large scale transformations of humanoid characters. You should understand what makes “good 3D topology”, meaning that the wireframe of the resulting morphs are not bunched up or distorted.
- Strong understanding of UV mapping. Similar to 3D topology, the UV mapping should not appear to be bunched up or distorted as a result of morphing

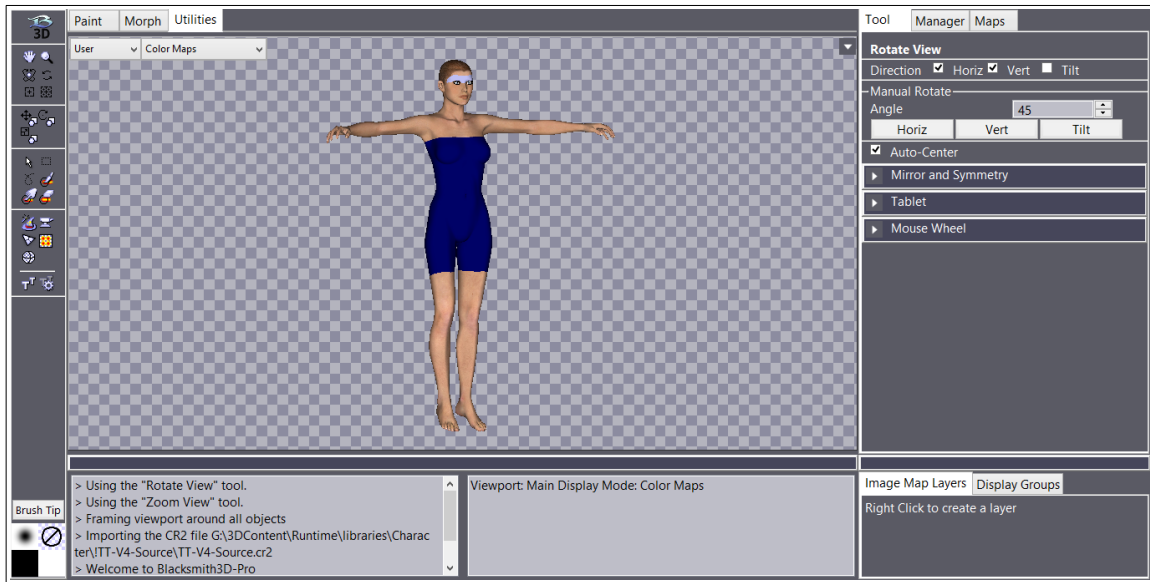


procedure.

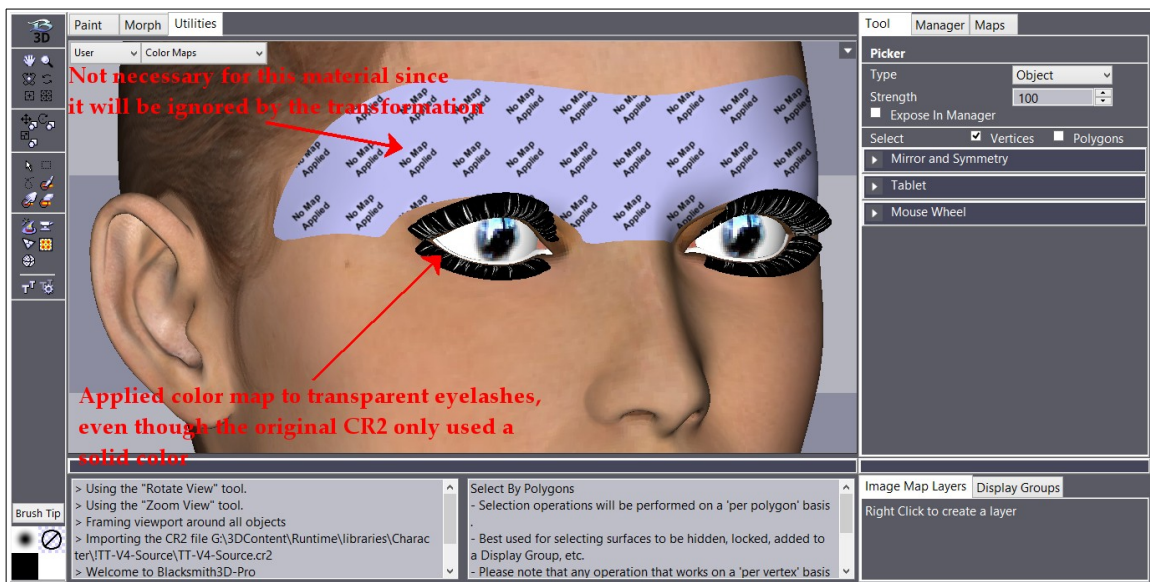
- Time and patience. While creating these transformation packages, many iterations may be required to achieve professional results. Texture warping will certainly occur in several parts of the surface when the first few transformations are generated. By progressively unwarping and adjusting the surfaces to both overlap with each other while simultaneously minimizing the distortion, a transformation that is acceptable will eventually be achieved.
- By recognizing limitations of the existing UV mapping on both character, and the 3D topology, there will certainly be portions of the textures that do not transform perfectly. You should be able to achieve good results with enough work and attention to detail.
- If you create several transformations packages successfully, you will no doubt be able to create new ones faster and better.

With all of that being said, let's walk through the procedure for creating a Texture Transformation package.

First import the source CR2 file. This is the character that you will be transforming the textures FROM. Also, for the sake of simplicity, please make sure that the source and destination CR2 files, along with all of their support files ( OBJ, textures, etc. ) and in the **same Runtime structure**. This will save you lots of headaches in the future. It would be especially useful to keep them all in the same folder as a fail safe.



Next is to make sure that all material groups ( or zones ) that are to be converted contain a color texture map, even if the characters may typically omit a color texture map on certain materials. Typical examples may be eyelash or eyebrow textures, which often have a transparency map with no textures. Please note that these material-map associations **MUST FIRST BE MADE IN THE SOURCE CR2, BEFORE IMPORTING INTO BLACKSMITH3D.**



For simplicity, **remove all references to bump maps, transparency maps etc.** For the purpose of generating the texture transformation, these are not required. The conversion package will still be able to convert these other types of maps.

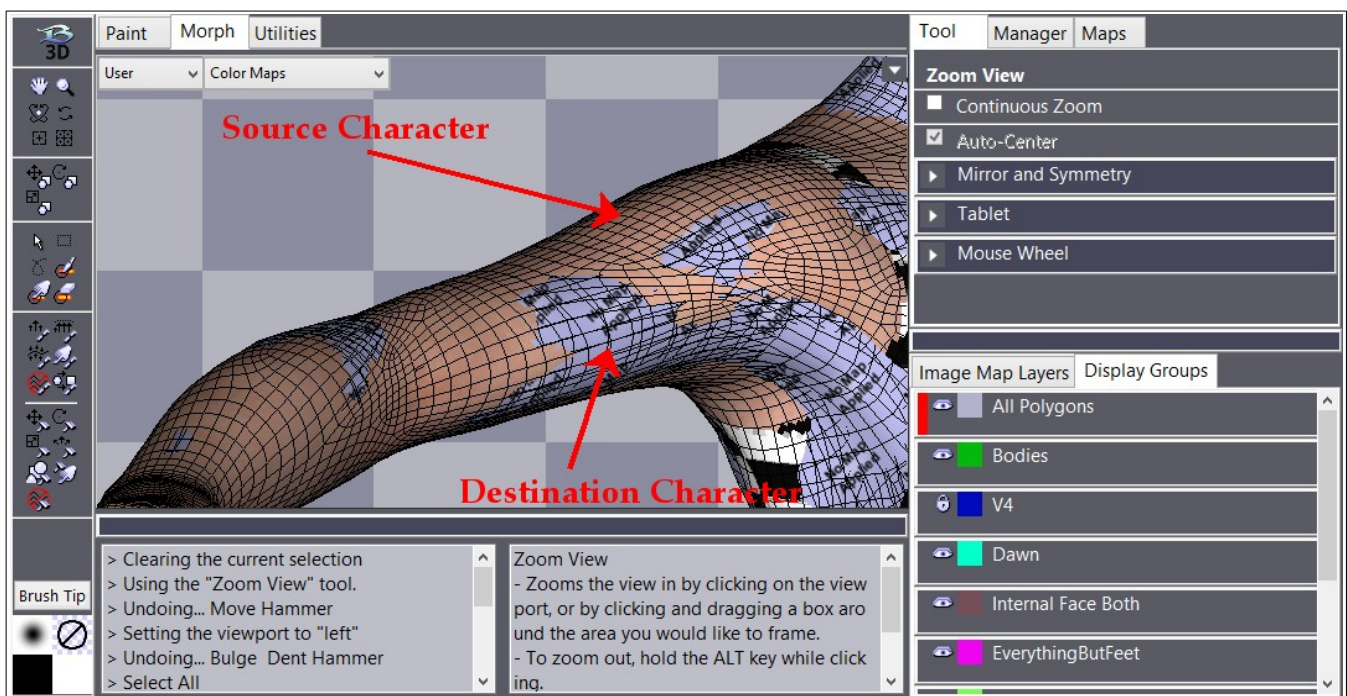
The next step is to create a **display group** for this character so it can easily be hidden or locked. Please see the Creating and Editing Display Groups tutorial for more details.

Next, import the CR2 file that will be your DESTINATION ( e.g. Dawn ). For this character, you should import the character with **Import Textures** unchecked, as it's best not to have any ( to avoid confusion, and they are not necessary ).

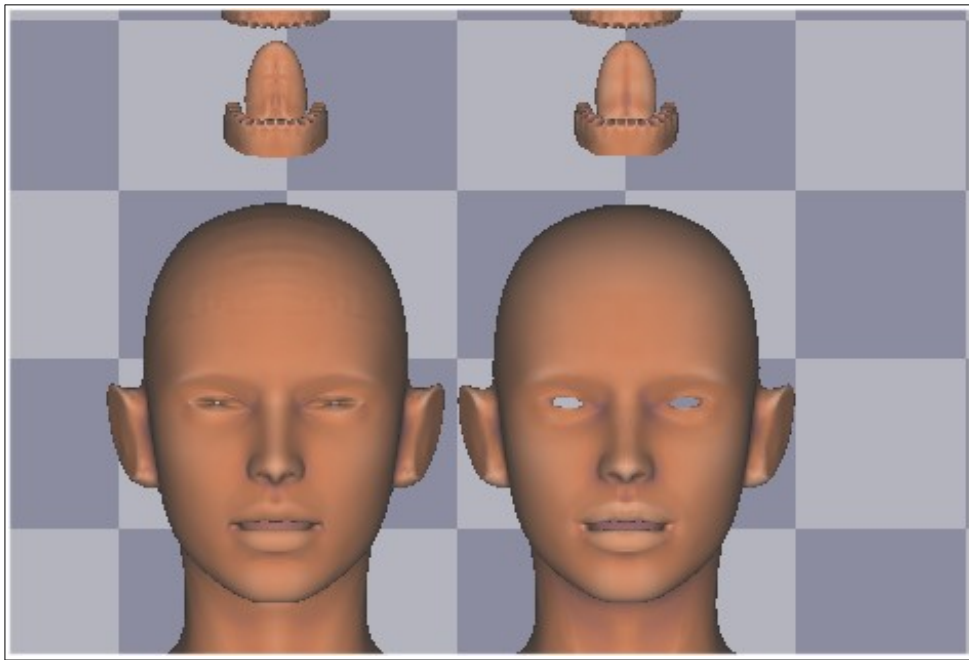
Now, make a **display group** for the destination character, again for easy management. Please see the Creating and Editing Display Groups tutorial for more details.

You are now ready to begin the morphing procedure. Please note that we cannot show you all, or even most of the steps required here. You should already be an experienced character morpher, and we will simply give you the guidelines for creating the morphed pair.

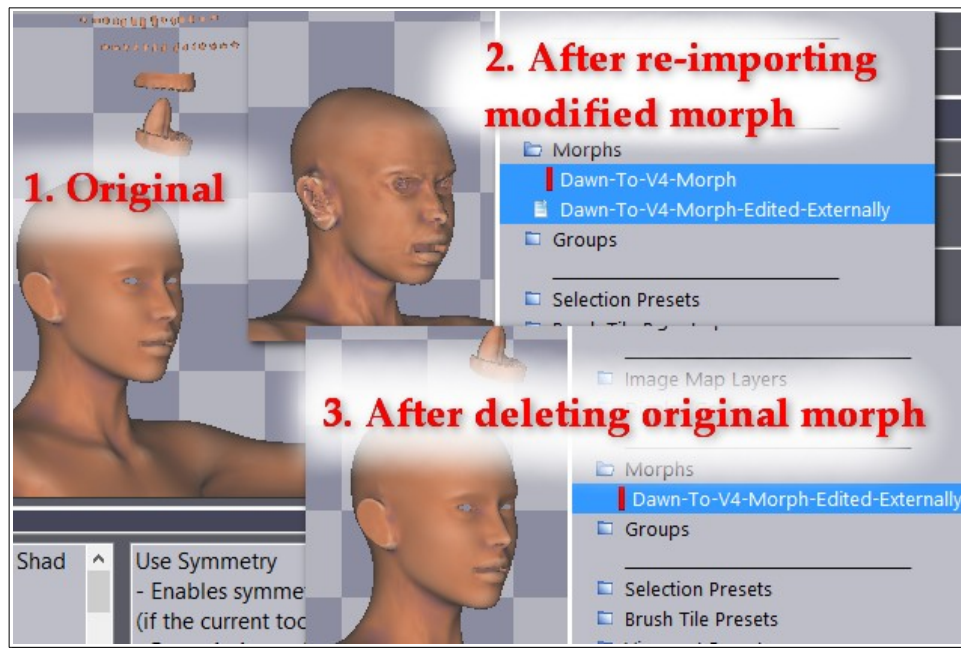
The very first step is to do a rough “pose” morph so both character are roughly the same size, and their limbs are roughly in the same place.



**Big tip!** it is best to, as much as possible, morph the **destination character** into the shape of the **source character**. There may be circumstances as you are refining the morphs where you end up morphing portions of the source to match the destination, but try to make the morph destination look as much as the source as possible before doing such refinements. This will save you lots of time in reworking bad morphs because they became too distorted, or disorganized. Notice in the image below how the source character ( V4 ) is on the left, and destination character is on the right ( Dawn ) and how they look nearly identical. In this case you will noticed that we morphed the ears on both to help compensate for complex geometry ( which was difficult to match up as it was ).



You can do the morphing inside Blacksmith3D, or by importing/exporting morphs to/from your favorite modeling or sculpting package. When doing so, please be mindful that the exported OBJ file will contain the current state of the morph targets. So, if you export a morphed character to another package, modify it, and the re-import it as a morph target, you may have to delete the old morph target ( inside Blacksmith3D ) to prevent the character from being **double-deformed**.

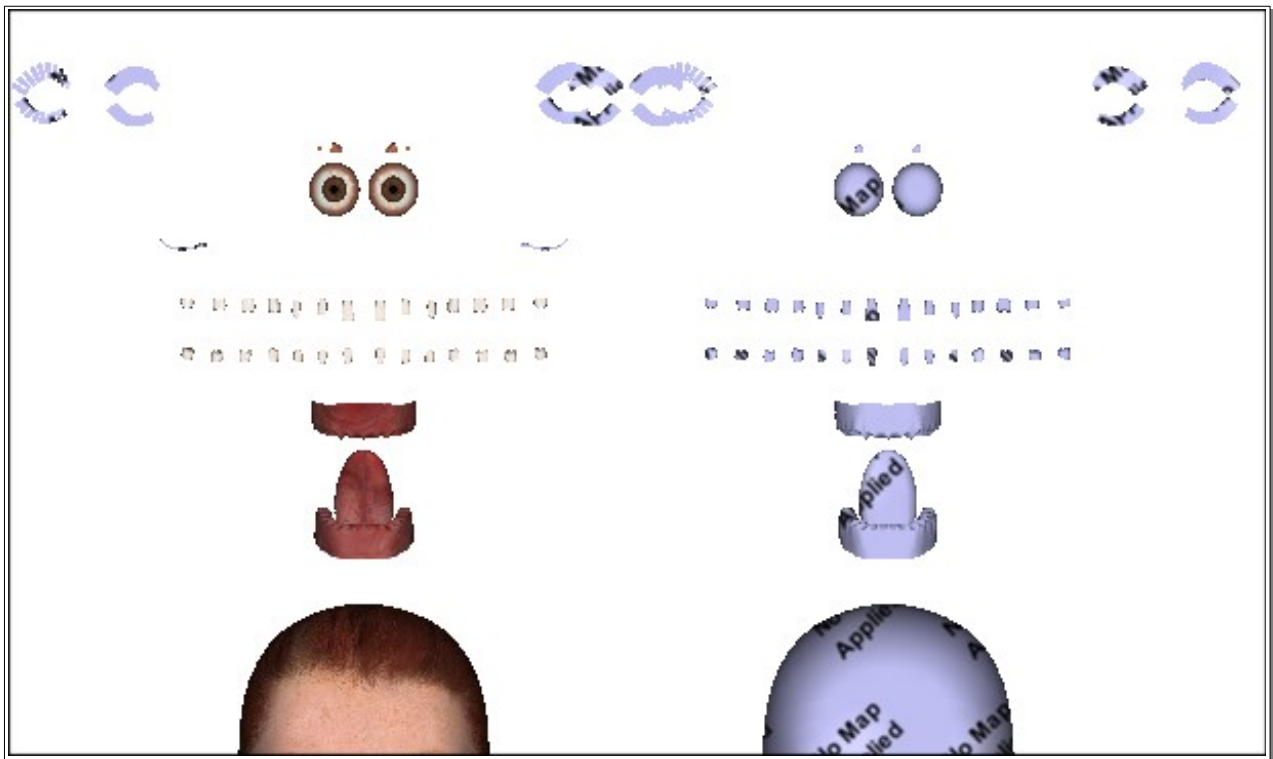


So if you **carefully keep track of your morph targets**, you can utilize any 3D morphing tool to achieve the results that you desire. If you are very comfortable morphing inside Blacksmith3D, then there is no need to do this, unless you have another tool that can make the job faster and easier.



A major thing to consider is the inner face geometry. You will certainly want to create display groups to help you manager these items ( e.g. creating display groups called Victoria-InnerFace, Victoria-Eyeballs, etc. ).

You can use the picker tool using the **Material**, **Group** or other types to help you select and isolate these parts, and then use the **Move Hammer** deformation tool to move them outside the boundaries of the head. Here is a picture of both Victoria 4.2 and Dawn with their inner face geometry separated.



Please note that the above image shows one of the character moved to the side for clarity. Without this horizontal transformation, the two meshes should overlap near perfectly when the project is finished.

You can choose to layout these inner face parts however you see fit. They should be well organized and separated from each other for easy editing.

## Creating the Texture Transformer Package Folder

In the Blacksmith3D folder, there is a sub-folder called TextureTransformerData. Inside that folder, please create a folder for your custom transformation ( e.g. V4\_to\_Dawn ).

The first file you should create and place in your new folder is one called **settings.ini** . It is a simple text file that you can edit, being sure to save the file in ascii text, not any other format such as Rich Text, Doc, etc. It's contents should appear as follows

```
sourceOBJ    blMilWom_v4b
destOBJ      Dawn
description   Victoria 4.2 to Dawn
sourceNotes  The CR2 file MUST be based on Victoria 4.2
destNotes    The CR2 file MUST be based on Dawn
```

The first two entries are the OBJ file names ( without the OBJ suffix ) as they appear inside their respective CR2 files. If you do not understand the inner structure of CR2 files, then please consult Poser's documentation and the community at large for resource relating to CR2 files and their structure.

The **description** field is how the transformation package will be described to the user when they choose it from the interface. **sourceNotes** and **destNotes** are extra instructions for the user to help guide them.

The next file you need to create needs to be called **DestMapGroups.txt** . It will describe which materials “share” maps, and what the default dimensions of those maps should be. Here is an example from the V4\_to\_Dawn transformation that ships with Blacksmith3d...

```
group  eyes  2000    2000
mat      1_Eyes
mat      1_Iris
mat      1_Lacrima
ma      1_Cornea
mat      1_Pupil

group  mouth  4000    4000
mat      2_Teeth
mat      2_Gums
```

```

mat          2_Tongue
mat          2_InnerMouth

group  head  4000  4000
mat          3_Face
mat          3_Ears
mat          3_Lips
...

```

These groups associate the maps and materials in the **DESTINATION** character, in this case Dawn. Also note that in this case, the creator of Dawn was nice enough to add a numeric prefix to each material name, so it's easy to locate what materials share the same maps. In this case, all the materials with the prefix **1** share the **Eye** map, **2** share the **mouth**, etc.

So, the first group is described as “group eyes 2000 2000”. The keyword **group** indicates that a new map group is about to be defined, then the next item is the name of the group, and the following two numbers are the default width and height of the texture maps as they will be generated when **high resolution** is chosen in the export options.

Following that, is a list of all materials that belong to this group listed like...

```

mat          1_Eyes
mat          1_Iris
mat          1_Lacrima

```

So, populate this file so all map groups are defined and all materials belong to a group, unless for some reason it should be omitted from the transformation.

Next are two optional files called **SourceBleedIndices.txt** and **DestBleedIndices.txt** . By default, each material has the bleed index of 0. Now let's take the case of toenails and fingernails. They may be very close to polygons with skin textures, but you will probably not want those textures to bleed together due to their close proximity. In this case, for both the source and destination objects, you will want to give the toenail and fingernail materials a new bleed index. In the following example, we'll give all nails the bleed index of 1.

So in **DestBleedIndices.txt** we have...

```

5_Toenails 1
5_Fingernails 1

```

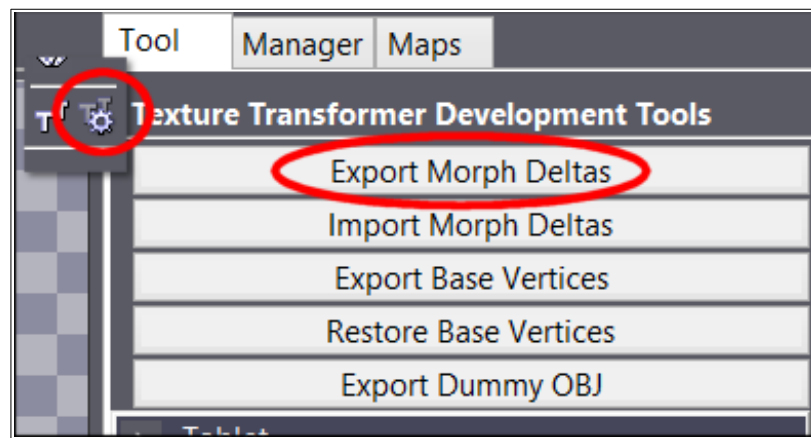
and in **SourceBleedIndices.txt** we have...

3\_Fingernail 1

3\_Toenail 1

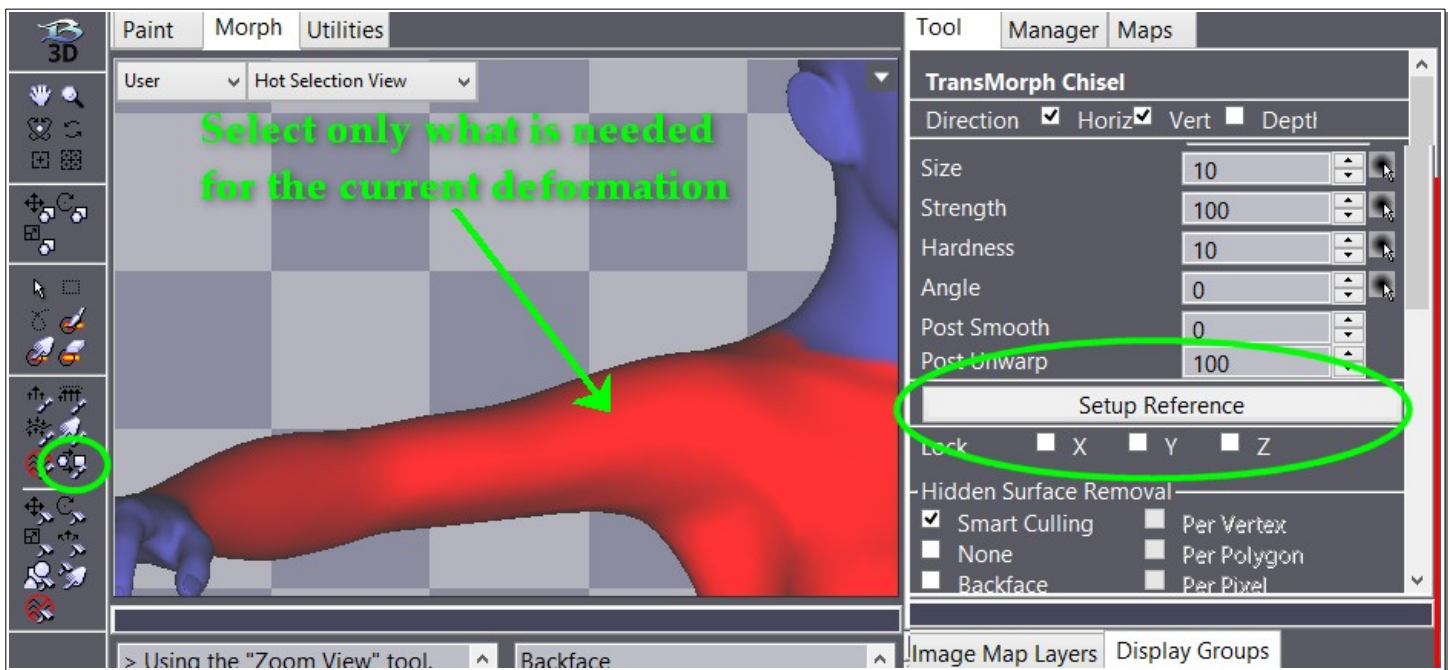
Be extra careful to use the proper material names for the source character in **SourceBleedIndices.txt**, and the destination character in **DestBleedIndices.txt** . It would quite easy to accidentally use the opposite material names, so please double check them.

The remaining files required are **sourceM.DAT** and **destM.DAT**, which are binary files containing the morphs for the source and destination objects that make them overlap into roughly the same shape. They are exported using the **Texture Transformer Development Tools**.



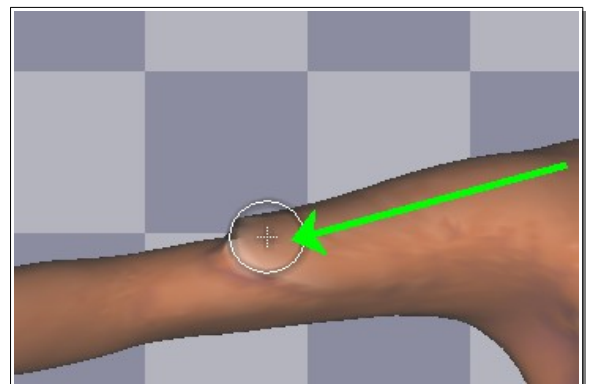
## Using the TransMorph tool for the Texture Transformer

Once you have roughly morphed the characters to the same proportions and pose, you can start using the Transmorph Chisel tool to refine the morph. First, hide the display group that you created for the destination character, so only the source character is visible. Using the selection tool of your choice, select a portion of it's surface. Then, choose the **TransMorph Chisel** tool from the left panel and then click on **Setup Reference**. This will take the selected surface and create **point cloud** that the brush will use to morph the other object into the shape of.



You can then hide the source character's display group, and reveal the destination character's group. Then use the TransMorph chisel by clicking and dragging on it's arm and shoulder to morph it into the same shape.

**PLEASE NOTE** it is very important that you first did a rough "pose" morph as previously mentioned put the two characters in roughly the same size and position. If the matching surfaces are too far away from each other, you will not achieve satisfactory results.





From this point on, you will have to utilize your morphing skills to perform the best pair of morphs possible, so both characters near perfectly overlap. Here we will re-iterate a few key points...

- Try to morph the destination into the shape of the source as much as possible, do as little morphing on the source as possible ( except for the inner face redistribution as shown in previous images ).
- Utilize the **Resolution Visualizer** and look for areas of the morphed surfaces that appear distorted ( that are not distorted when the morph(s) strengths are set to zero ).
- Use the **Unwarp Chisel**, with the **Relative** type to help combat texture distortion that is the result of heavy morphing.
- Save your project often, and save multiple versions in case you make a big mistake and want to go back to a previous state. Your project folder should look something like this... ( note, hard drive space is cheap, so save incrementally as often as possible. You can delete the older files at a later time. )

MyTextureConversionProject\_001.blacksmith3D

MyTextureConversionProject\_002.blacksmith3D

...

MyTextureConversionProject\_089.blacksmith3D

- When generating the texture packs, it is extremely convenient to edit the file **DestMapGroups.txt** such that it only includes a single group at a time, or perhaps a small subset of the groups. In this way, you can trouble shoot a particular area of the surface ( e.g. face ) without having to generate the data for the entire body. You may also consider using a lower resolution for the initial drafts as well. So the file may look like this...

```
{ begin}
grouphead 1000 1000
mat 3_Face
mat 3_Ears
mat 3_Lips
{end}
```

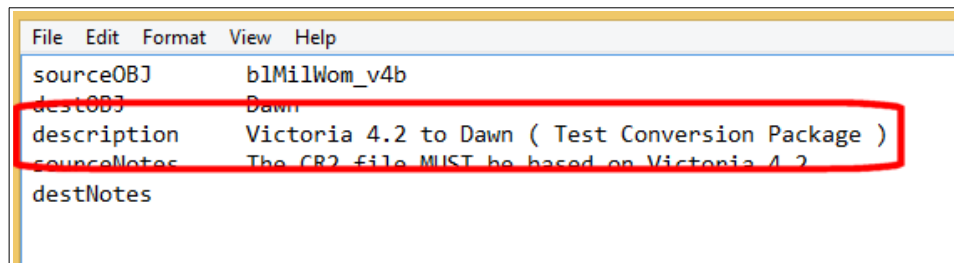
## Exporting the dummy object file for the Destination character

The Texture Transformer is able to perform conversions without a destination CR2 specified. However, to achieve this, we have to export a dummy version of the character which contains the same materials as the original. To do this, make sure the destination file is set as the **current object** in Blacksmith3D ( as indicated by the red marker in front of it in the **Manager** ). Then choose the **Texture Transformer Development Tool** from the **Tools->Utilities** menu, and then click on **Export Dummy Obj**. Save the file as a01.dat and place it in the folder Texture Transformer conversion folder for this conversion. For example...

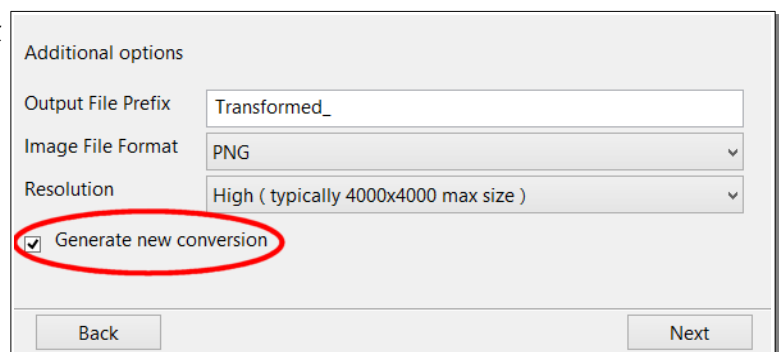
...\Blacksmith3D-v7\TextureTransformerData\V4\_To\_Dawn\a01.dat

## Generating the Texture Transformer Data

After saving your project ( it will get lost after the Texture Transformer has been launched ), choose the new conversion from the drop-down menu. If you have created the **settings.ini** properly, then it should show up in the drop-down menu using the **description** field ( e.g. Victoria 4.2 to Dawn ).



Then choose the source and destination CR2 files ( in this case, the destination file IS necessary, it is only optional when not generating the conversion data ). When the options window appears, choose the **Generate New Conversion** checkbox. You will be prompted to confirm the action since it is not meant to be used by casual users, and it can destroy the existing Texture Transformer data for the selected conversion.



The texture conversion process will take much longer than usual, which is why it is especially important to start off with lower resolution conversions as specified in the **DestMapGroups.txt** file, and not test all of the groups at once.

When the process has completed, for each group in the **DestMapGroups.txt** file there should now be a file called S2D\_[group name]. e.g. S2D\_head, S2D\_body, etc.

These files can be stashed away in other folders if you want to perform another test without losing the initial data, but be sure to keep them in sync with the dimensions specified in the **DestMapGroups.txt**, because if you change the width or height, the S2D file will no longer be valid.

### **Iterating and perfecting the Transformation**

Your first few attempts at making a texture transformation will certainly have plenty of mistakes, texture warping and holes in the texture. You will have to take notes ( with screen shots ) of the problem areas in the generated textures, and then go back and refine the morphs so the characters are not only overlapping, but key features are properly lined up.

A common mistake may be to have the elbows or knees not lined up properly, or the lips may be too wide, etc. You must take great care such that all the major points of interest are lined up properly.

## Budgeting Time

In all likelihood, unless you are very ambitious hobbyist, you will be creating a Texture Transformer conversion package for commercial purposes. You may be under contract with Blacksmith3D to create packages, or you may be a content provider and would like to have your own 3D creations supported by the Texture Transformer. In any case, you should probably budget at least a week of full time work to get professional results for a full character conversion package.

If you are creating a texture conversion for something other than a full character, such as clothing objects, or perhaps just a face texture conversion ( omitting the body, and perhaps details like teeth, eyes, and inner mouth ), then perhaps it can be done in less time. In any case, its a big job and make sure that it's worth the time for you to invest in the project.

## Review Final Checklist

Here is a simplified list of everything you have to do to create a Texture Transformer package.

- Export a dummy object for the destination character **a01.dat** ( make sure it's the current object by indicated by the red marker in the Manager ) using the **Texture Transformer Development Tools**.
- Create and edit the **settings.ini** file with basic info for the transformation.
- Create and edit the **DestMapGroups.txt** file to link the destination materials with the newly created maps ( e.g. all “head” materials such as face, lips, etc. associated with “Head” group ).
- Create bleed index files **SourceBleedIndices.txt** and **DestBleedIndices.txt**
- Morph both the source and destination characters so they near perfectly overlap, pulling out the inner face geometry. Export the morph deltas ( all deformations spawned into a single morph ) as **sourceM.DAT** and **destM.DAT** using the **Texture Transformer Development Tools**. Remember to make sure the appropriate object is **current** via the red marker in the manager before exporting.
- Run the Texture Transformer using the **Generate new conversion** option to generate the conversion data ( e.g. S2D\_Head, S2D\_Body, etc. ).
- Iterate as much as possible to refine the morph to achieve the best possible

conversion.



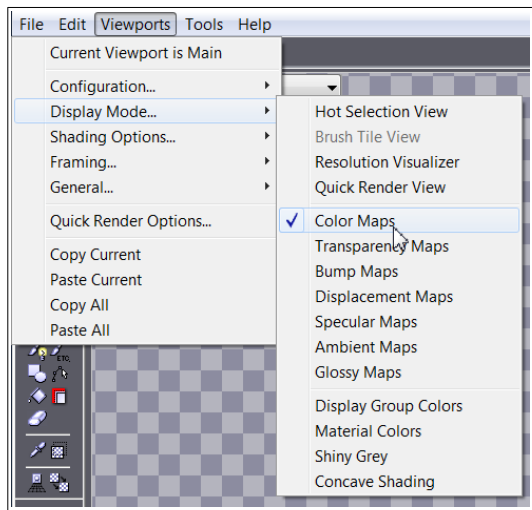
## Conclusion

Creating a Texture Transformer package is quite a bit of work. However, once it's is done it can be used to convert thousands of texture sets, being used by thousands of people. It is a powerful tool to facilitate the transfer of digital assets between standardized 3D characters, standardized being the key word.

## 6. Reference

In this section, we will list all of the features in Blacksmith3D and describe how they work. The sections to follow are not meant to be tutorials, rather, they should be used to gain insight on individual features of the software.

### Menu



The menu in Blacksmith3D has been laid out in a standard fashion to be consistent with the vast majority of software applications. There is a standard **File** menu, where you expect to find the file input and output capabilities. Likewise there is an **Edit** menu which contains the Undo/Redo functions, and several others. The **Help** menu contains links to online help resources, the **software registration** window, the **About** window, etc. Specific to Blacksmith3D, there is a **Viewports** menu which contains all of the functions for configuring

the 3D display. Finally there is a **Tools** menu, which offers access to all of Blacksmith3D's tools, even though they also exist as icons in the left side of the interface.

Since Blacksmith3D is a cross platform application, for both Windows and Mac OS X, the menus are slightly different as you may expect; In Windows, the menu appears at the top of the window, while on OS X, the menu appears at the top of the desktop ( only when the application is active in the foreground ). Some OS specific features may be injected into the menu ( e.g. OS X may inject a "Search" menu item ), but these should be generally ignored as Blacksmith3D only supports the menu features that it directly implements as covered in the manual.

## File menu

As expected, this menu contains all of the file import/export functionality, with a few minor exceptions. Some items may also be imported and exported via their right-click context menu in the **Manager** ( e.g. Image Maps ), and the **Texture Transformer** utility ( Blacksmith3D-Pro only ) will directly export Image Maps and a MAT file.

### *New Project*

Clears the current project and creates new (empty) one. If any objects or image maps exist in the scene, you will be prompted to confirm your choice before proceeding, to prevent the accidental loss of data.

### *Open Project*

Opens a previously saved Blacksmith3D project. Blacksmith3D project files have the file extension .blacksmith3D, which may seem odd to some people who are used to three letter extensions used by most Windows applications. However, the descriptive file extension makes it perfectly clear that the file is indeed a Blacksmith3D file, and not some other application that happens to use the B3D suffix. You can load projects from previous versions of Blacksmith3D mostly without issue, but a few features may have changed from version to version, so some adjustments may be required.

### *Save Project*

Saves the current state of the project to a blacksmith3d file ( see comments about .blacksmith3D file extension in the **Open Project** section ). If the project has yet to be saved, you will be prompted to provide a file name and location. If the project has already been saved, it will simply be replaced with the current one.

### *Save Project As...*

Prompts you to provide a file name and location for the project that is about to be saved, regardless if it has been previously saved or not.

## Import and Export

*Importing a file* is a two step process. First, you are prompted to locate the desired file from a standard “Open File” dialog, which is filtered to only show the supported file types. Based on what file type of the file, you may be prompted to provide additional import options before proceeding.

**Please Note** that you can import any of these files by simply dragging and dropping them into the 3D viewport, and hence skipping the open file dialog step.

*Exporting a file* works in reverse, where you specify the type of file that you would like to export first, set the options, and finally, export the file.

## Image Maps

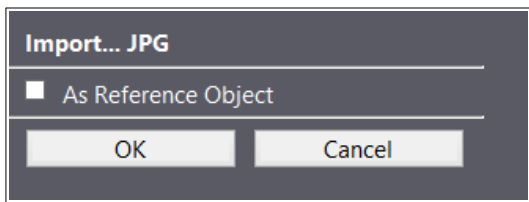
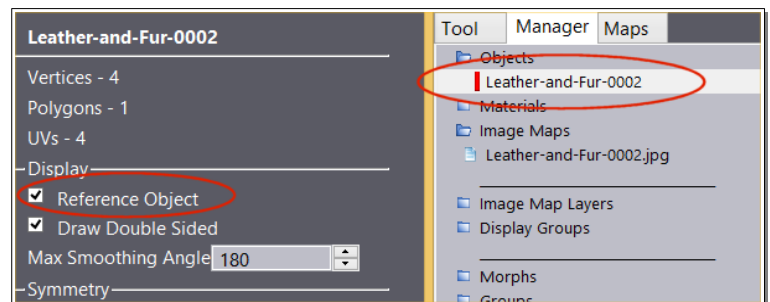


Image maps can be imported via the **File-Import...** menu , by drag and dropping the files into the viewport, or the right-click context menu in the **Images** section of the **Manager**. In all cases, you are presented with a single import option, and that is **As Reference Object**. If this option is unchecked ( default ) then the image map will be loaded into the manager for further use ( usually as a texture map ).

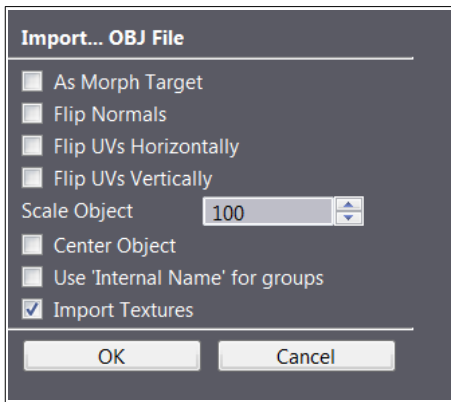
If **As Reference Object** is checked, then a rectangular object will be created and the imported map will be applied as a color map, so it can be used as a reference. In addition, the object will be set as a reference object ( see **Manager-Objects-[object name]-Reference Object** ), which means that you cannot edit the object, unless the option is manually unchecked.



Exporting image maps do not require any special options, but you may need to specify which image maps are to be exported. If no image maps are highlighted in the **Manager**, then all of the maps will be exported. If one or more images are highlighted, then only those maps will be exported.

It is also important to note that the file type is determined by the name of the image map in the manager. If the file name is *MyImage.png*, then the file will be exported as a PNG file, ditto for jpg, etc. To change the file type, simply rename the image map in the Manager.

### OBJ file



Probably the most important import type in Blacksmith3D. Imports a standard OBJ file which can be imported or exported from most 3D applications on the market. Even though OBJ files are an industry standard, there are differences between applications that may require additional options.

**As Morph Target** will load the OBJ file as a morph target for the current object in the Blacksmith3D project. As such, it **MUST** have the same number of vertices as the the current object, and it must have the same vertex ordering.

**Flip Normals** will visually turn the object inside-out, by reversing the order of the points in each polygon. Some applications will export their objects with a different standard for calculating the surface normals, making this option essential.

**Flip UVs Horizontally** is not commonly used, but there may be 3D applications that have a different standard for UV's where the UV's must be reversed in the horizontal direction. More commonly used is the **Flip UVs Vertically** option below, since there are many applications that export objects with their UV's in this way.

**Flip UVs Vertically** is used to reverse the UV coordinates in the vertical direction ( V ) such that  $V = 0$  becomes  $V = 1$ , and  $V = 1$  becomes  $V = 0$ , etc. This comes down to the simple issue of different 3D applications providing a different standard as to how to relate the UV coordinates to a pixel in an image map. In other words, there is no standard and some do it one way, and some do it another way.



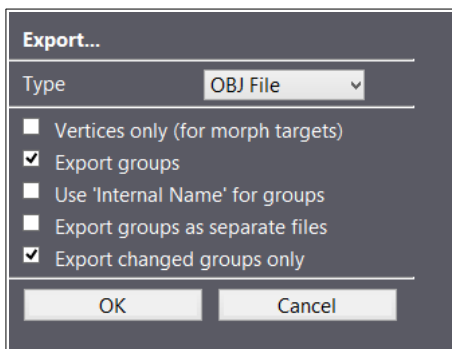
**Scale Object** will resize the object on import by the percentage value inputted. This option should always be left at 100% unless you truly have a good reason to change it. If you need to rescale an object in a temporary fashion, you can use the **Scale Object** transform tool. If you are only editing a single object, you should never need to rescale it since Blacksmith3D will adjust it's viewports and tools for whatever size the object happens to be, with perhaps only the most extreme cases causing it problems ( objects scaled well below the {0..1} range may result in some unexpected behavior.

**Center Object** will reposition the vertices such that the center of the object is at exactly { 0, 0,0 } in a permanent way.

**Use Internal Name for groups** is specifically used for OBJ files being interchanged with Poser. It will use a comment in the OBJ file to specify the group like...

```
# InternalName:Head
```

**Import Textures** will attempt to load the textures associated with the materials, as defined by an optional MTL file which is often exported along side an OBJ file by most applications. Not all material channels are supported by OBJ files, and support varies from application to application. Color maps and bump maps are often supported, while transparency, displacement, etc. usually are not. In these cases, you will have to manually import the image files and assign them via the **Manager**.



*Exporting OBJ files* also has options to consider, which depend on the platform that you are exporting it to.

**Vertices only** ( for morph targets ) will create a lean OBJ file that contains nothing more than vertices. This can keep the file size small and loading times fast. Most applications will accept these OBJ files when loading them “as a morph target” for complete object which is

already loaded. If it does not work properly in the host application, then simply uncheck this option and try again.

**Export Groups** will specify the OBJ groups in the file using the **g** command. If you do not know what this means, leave it checked.

**Use Internal Name for groups** is specifically used for OBJ files being interchanged with Poser. It will use a comment in the OBJ file to specify the group like...

```
# InternalName:Head
```

**Export Groups As Separate Files** will save a new OBJ file for each group in the object, using the input file name as the prefix. So if you export the file as MyCharacter.obj, what you will actually get is...

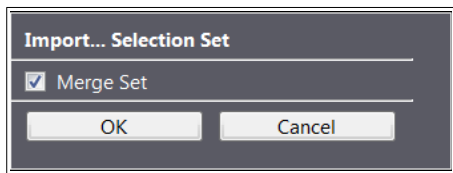
MyCharacter\_Head.obj

MyCharacter\_Neck.obj

etc.

This is useful when creating morph targets from OBJ files that were exported from Poser ( as opposed to using the CR2 import ). For more information, please see the **Creating morph targets for Poser via OBJ import/Export** tutorial.

#### *SelSet ( Selection Set )*



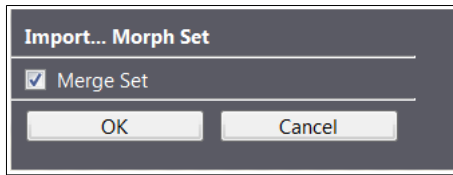
SelSet files can be exported from Blacksmith3D and re imported in later for future use. They contain the **Selection Presets** for the current object ( only ) in the project. They are especially useful if you have a 3D

object file ( perhaps a standard character ) that you use for multiple projects. You can export the selection presets from one project, and re-import them into a fresh project containing the same object. When the **Merge Set** option is checked, the new selection presets will be merged with any existing ones in the project. When it is unchecked, the existing selection presets will be cleared before importing the new ones.

When importing the SelSet files, if multiple objects are present in the scene, please be sure to make the desired object **current** by clicking on it in the **Manager** as indicated by the leading red marker.

*Exporting SelSet files* requires no options to be set, but be mindful that it will only include the selections for the **current object** in the project, indicated by the leading read marker in the **Manager**.

#### *MorSet ( Morph Set )*



MorSet files follow the same conventions as the SelSet files, except they contain the morph targets of the current object. So, like SelSet files, if you have the same base object for multiple projects, you can export the morphs

from one project, and import them into a fresh new project. When the **Merge Set** option is checked, the new morph targets will be merged with any existing ones in the project. When it is unchecked, the existing morph targets will be cleared before importing the new ones.

When importing the MorSet files, if multiple objects are present in the scene, please be sure to make the desired object **current** by clicking on it in the **Manager** as indicated by the leading red marker.

*Exporting MorSet files* requires no options to be set, but be mindful that it will only include the selections for the **current object** in the project, indicated by the leading red marker in the **Manager**.

#### *DisplayGroupSet*

DisplayGroupSet files allow you to export and import display groups for the **current object**, hence can only be used with other projects that contain the same original object ( i.e. same number of polygons, same polygon ordering ). This is essential since display groups are assigned on a per-polygon basis, and the information contained would not be useful for any object other than the one that originally created them.

When importing the DisplayGroupSet files, if multiple objects are present in the scene, please be sure to make the desired object **current** by clicking on it in the **Manager** as indicated by the leading red marker.

*Exporting DisplayGroupSet files* requires no options to be set, but be mindful that it will only include the selections for the **current object** in the project, indicated by the leading read marker in the **Manager**.

### *Commentary on “Set” import/export types*

The purpose of these file types ( SelSet, MorSet and DisplayGroupSet ) are to facilitate the transfer of data between Blacksmith3D projects that are based on the same base object. For example, if you have a standard character object that you create content for, you may spend a lot of time setting up display groups, selection presets, etc. . These may come in handy in any number of projects, so being able to reuse them will greatly increase your productivity.

### *Sculpted Prim*

Sculpted Prim files can only be exported. It is a highly specialized export type that allows you to export a morph ( or combination of morphs ) of a primitive object ( sphere, plane, etc. ) as a **PNG file** of size 32x32 pixels ( or 64x64 if the **Double Size** option is checked ) to be imported into **Second Life**.

The resulting image is color coded, so each RGB pixel represents an XYZ value, which when applied properly in Second Life, will deform the primitive object into the rough shape ( may not be exact ) as it was morphed in Blacksmith3D.

Conditions for it to work properly are...

- Imported primitive shape **MUST** have UV coordinates that are consistent with the primitive objects used in Second Life. A sphere must have proper spherical UV coordinates. A plane must have a simple planar mapping fit perfectly to the bounds of the plane, etc.
- Due to resolution issues in Second Life, the resulting sculpted prim may look smooth and miss some of the sharper details that were present in Blacksmith3D. To compensate for this, you can export the Sculpted Prim as double size, so the resulting image will be a 64x64 png file, and not the standard 32x32 size.
- A strong knowledge as to how Sculpted Prims work in Second Life. This is not a feature for use by beginners.

### CR2 Files

CR2 files are character files used with Poser and DAZ Studio. It is important to note that not all CR2 files are supported by Blacksmith3D, and manual importing of the OBJ file and image maps may be required in some cases.

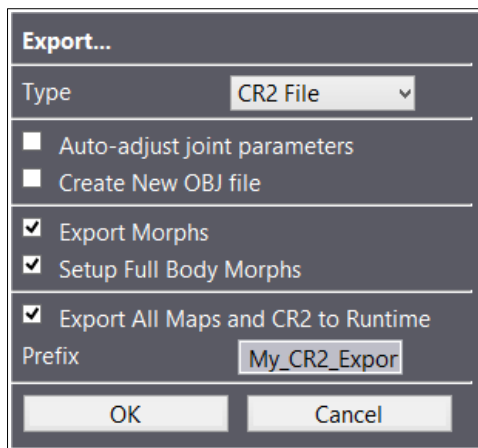
The main limitation to importing CR2 files is that only one OBJ file reference per file is supported. In addition, no “replacement body parts” are supported, and the original body part ( as defined in the main OBJ file associated with the CR2 file ) will appear.

Regarding importing material channels, all of Blacksmith3D's material channel types are supported ( color, bump, transparency, etc. ) providing that simple **image\_map** channels are used when created in Poser. Complex shader trees with multiple nodes are not directly supported, so you will have to import the images manually into Blacksmith3D and assign them to the **correct materials and channels** for them to be edited properly.

**Importing CR2 files** has two options. **Import Morphs** will import the morph targets that exist in the CR2 file ( not in external binary files, see Poser documentation for more details ). It is highly recommended that if you do import morphs, that you do so from a CR2 file that is not overloaded with too many morphs. If possible, setup a CR2 beforehand with just the morphs that you will actually need in Blacksmith3D and import that one.

**Import Textures** will attempt to load all of the image maps associated with the character, as long as simple **image\_map** shader associations are used. If any particular map does not get imported, then you will have to manually import the map and assign it to the proper material channels via **Manager-Materials**.





*Exporting CR2 Files* has many options, most of which you probably will not need unless you are doing advanced character creation work. Also note that some may only work properly in conjunction with legacy CR2 files that do not use features such as weight maps.

**Auto-adjust joint parameters**, when used in conjunction with **Create New OBJ file**, will attempt to move the joint positions based on the current state of the morphed object in Blacksmith3D. This is useful if you would like to create a character that has different

proportions than the original, so the fingers, elbows, etc. may be in different positions than originally. Normally such extreme morphs will not work properly in Poser but this feature attempts to correct this. **Please note that this feature will only work with legacy CR2 files** that do not use weight maps for joints.

**Create New OBJ file** will export a new object file, based on the current state of the morphed object. In this case, the deformation is “baked into” the object instead of being applied as a morph in Poser. If the joint positions vary drastically, then using the **Auto-adjust joint parameters** option is recommended ( for legacy CR2 files only ).

Please note that using this option will NOT work properly with subdivided objects. The CR2 file may have weight maps, or hidden morphs ( for adjusting the joints, etc. ) that will not work properly if the vertex count has changed. This is ONLY used for baking the current morphs into a new OBJ file ( in conjunction with the **Auto-adjust joint parameters** feature ).

**Export Morphs** will include the newly created morph targets into the resulting CR2 file. If the CR2 file that you initially imported supports MOR injection files, then it is recommended that you use MOR files instead of CR2 export to bring your morph targets back into Poser.

**Setup Full Body Morphs** will link together the morphs for each body part, so they appears to be a single morph in Poser for the “Body” node. So if the morph spans more than one body part ( e.g. head and neck ), then it is recommended that you use this option.

**Export All Maps and CR2 to Runtime** allows you to export all relevant data to a Poser Runtime in a single step. The provided **Prefix** option will be used to name files and folders appropriately. For example, the textures will be placed in a folder like...

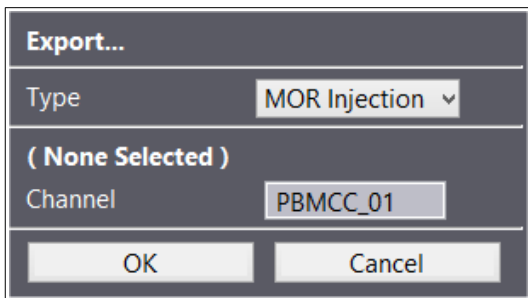
/Runtime/Textures/[ prefix ]/MyTexture.jpg

and the CR2 file will be saved like...

/Runtime/Library/Characters/[ prefix ]/[ prefix ].CR2

When prompted, you can choose a Runtime folder that contains your existing library files, or you can choose an empty Runtime folder if you wish to ZIP it up for distribution.

### *MOR Injection Files*



MOR injection files are special pose files ( pz2 ) that are used to dynamically apply morph targets in Poser. We will not get into how to properly set them up in the original CR2 files since that is specifically a Poser issue, however, it involves setting up hidden ( and empty ) morph targets in the CR2 file with special “internal” names. So when you apply a MOR

file that contains morph data and the same internal name, it will inject the new morph deltas, set the external name ( the one you read in the interface ), and unhide the morph making it accessible in Poser's GUI.

With that being said, you need to highlight a Morph target in the **Manager** so Blacksmith3D knows which morph to be exported. The **channel** must be specified, and this is the internal name of the special hidden morph that was discussed in the previous paragraph.

### *MAT Injection File*

MAT injection files are intended on being an easy way of setting up all of the texture maps in Poser in a single step. They are more flexible than MOR injection files, since no special setup is required. The only condition required for them to work properly is that the material names being exported from Blacksmith3D match the material names in the character that the MAT file is being applied to in Poser. However, it should only be applied to the same base character as the source CR2 file, with the same UV mapping, or the texture maps being assigned will not appear as they should in Poser.

Similar to the CR2 export, there is an option to **Export all Maps and MAT to Runtime** option, that will use the prefix to name the newly created folders and files. For example, the textures will be placed in a folder like...

/Runtime/Textures/[ prefix ]/MyTexture.jpg

and the MAT file will be saved like...

/Runtime/Library/Poses/[ prefix ]/[ prefix ]\_MAT.pz2

When prompted, you can choose a Runtime folder that contains your existing library files, or you can choose an empty Runtime folder if you wish to ZIP it up for distribution.

### *PP2 files*

You can import poser prop files via the PP2 import, or PPZ import ( compressed file ). The conditions for the prop file are the same as for CR2 files; it may only refer to a single OBJ file, and the image maps must be setup with simple shaders. If the PP2 import does not support the file you are attempting to import, then please export an OBJ file from Poser and import it and assign the image maps manually via the **Manager**.

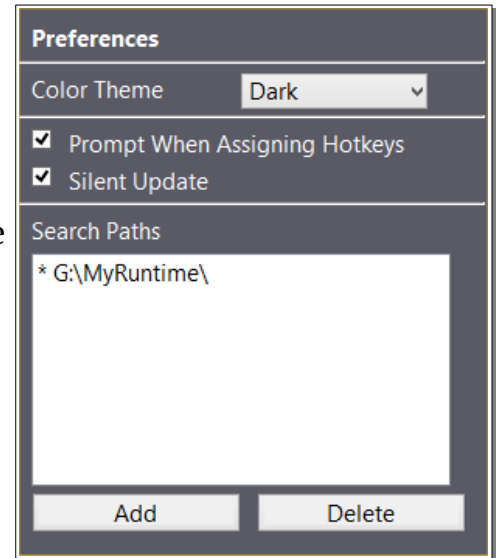
For the **Import Morphs** and **Import Textures** options, please see the CR2 Files section.

## Preferences

The preferences window provides options that are used globally in Blacksmith3D.

### *Color Theme*

You can change the colors of the Blacksmith3D interface depending on your personal preferences. **Native OS Colors** will inherit the colors assigned by your operating system, so the look will be consistent with other programs being used. In many cases, these colors may be considered too bright, as many graphic artists prefer to use a darker color scheme that is easier on the eyes for prolonged use. The **Light, Medium, Dark** and **Darkest** options will shade the interface accordingly. Most users will be most comfortable using the Medium or Dark color schemes. In all cases, the program will have to be restarted for the color changes to take effect.



### *Prompt When Assigning Hotkeys*

This option will provide the user with extra instructions when assigning hotkeys. Advanced users will want to turn this option off to experience a faster work flow.

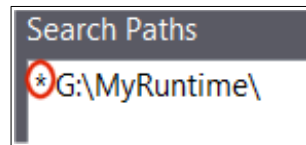
### *Silent Update*

Silent Update helps to minimize the prompting a user may experience when the software is checking the server for updates. It is recommended to keep this option checked.

## Search Paths

This box allows you to specify folders that should be searched when files need to be located ( e.g. texture maps, OBJ files, etc. ). Poser and DAZ Studio users will most certainly want to add their “Runtime” folders here. To add a search folder, click on the **Add** button. When adding a folder, you will be prompted asking if you would like to make the folder a **Recursive** search folder. If you answer yes, then every sub-folder may be queried when searching for a file, **which can be a slow process if there are too many files and subfolders**. a.k.a Do not add the root directory of you hard drive as a search folder, or your entire drive will be searched every time.

*Please note that in the list of folders, the \* symbol indicates a recursive search folder.*



A technical note for “Runtime” folders; You can add a Runtime folder as a **non-recursive folder** as long as relative paths are used in the source files ( e.g. Runtime/Textures/myTexture.jpg ) and the files will be located without recursion. This is highly recommended, especially if you have multiple files with the same file name in different folders. This will help ensure that Blacksmith3D is indeed locating the correct files ( and also speed up search time ).

To delete a folder, highlight it in the box by clicking on it and click the **Delete** button.



## Edit Menu

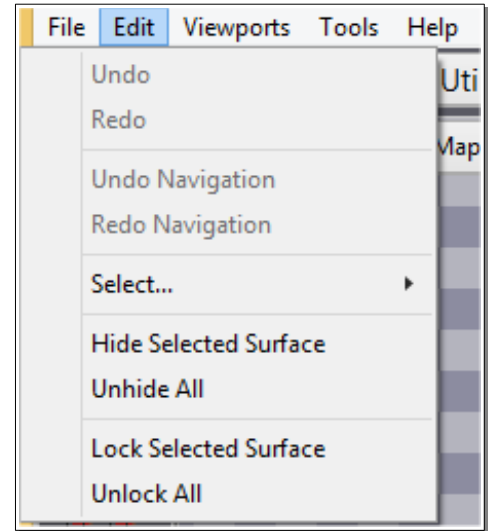
The edit menu contains some of the familiar features of most applications including undo/redo functionality. It also contains a Select submenu which has features for modifying the current selection. You can also hide, show, lock and unlock selected surfaces here.

### Undo

Allows you to undo the previous action ( if applicable ). Undo is most commonly used via the CTRL-Z hotkey. You can undo multiple steps back, depending on how much memory has been used.

### Redo

The opposite of Undo, you can redo a step that you have just undo, as long as you have not performed another action in the mean time. It is most commonly used with the SHIFT-CTRL-Z hotkey.



### Undo and Redo Navigation

Blacksmith3D has deliberately separated the undo/redo functionality for regular editing operations, and for navigating ( rotate, zoom, etc. ). Quite often you will want to undo the last edit ( e.g. paint stroke ), even if you have navigated in the mean time, or vice versa.

## Select...

The select submenu contains features for modifying the current selection. Some of these features have reserved hotkeys because they are used so frequently, and others can be accessed via this menu, or by assigning custom hotkeys if desired.

### Select All and Clear All

**Select All** will select every visible ( and unlocked ) surface in the project, includes multiple objects. It is most commonly accessed via the **CTRL-A** hotkey and should definitely be used in this way for an optimal workflow, even if you hotkeys are not your favorite thing.\

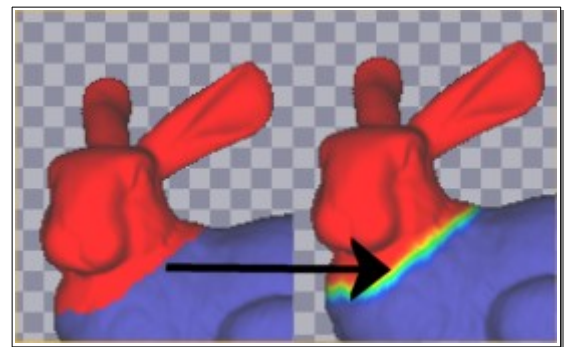
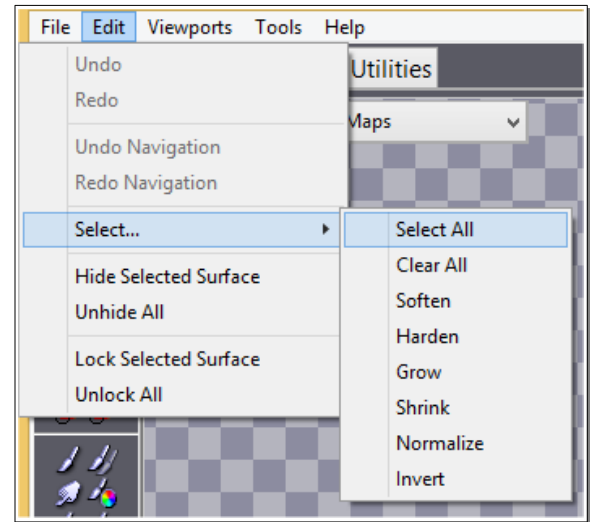
Likewise **Clear All** will unselect the entire surface. Hidden and unlocked surfaces need not be considered since they will always be unselected by design. The hotkey for this feature is **CTRL-U** and should definitely be used instead of the menu, again, because it is so commonly used.

### Soften

The soften feature will smooth the transition of the current selection between fully selected and unselected values. When creating morph targets with **Hammer** deformer, which heavily depend on the selection values, softening the selection is an essential technique for creating smooth and organic deformations. As such, the reserved **S** hotkey is used for softening selections and should be used.

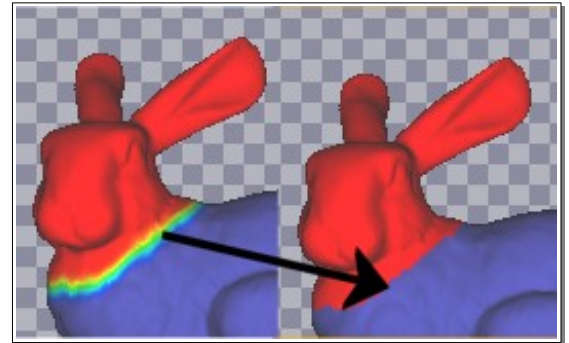
Often, you will want to soften the selection multiple times in a row, and doing it through the menu will be tedious, so simply press the **S** key a few times instead.

You can use the **SHIFT** hotkey to soften the selection in an outward direction ( so the selection grows ) or the **ALT** hotkey so it softens inwards ( shrinks ).



## *Harden*

Hardening a selection is the opposite of softening, as it makes the transition between fully selected and not selected abrupt. The hotkey for this option is **N**, and by default will make the selection either fully selected, or not at all. If you use the **SHIFT-N** hotkey, you can do a partial hardening of the surface.

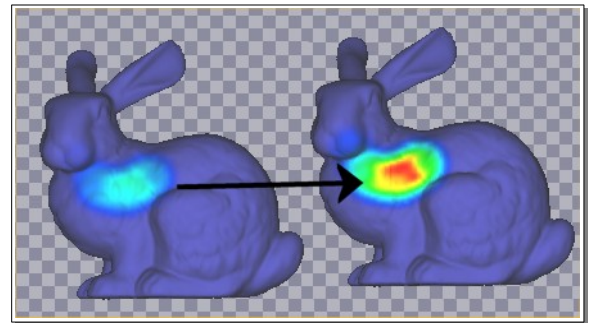


## *Grow and Shrink*

You can grow or shrink the partial selection using these options. The surrounding vertices/polygons will either inherit the maximum selection value of it's neighbors, or the minimum.

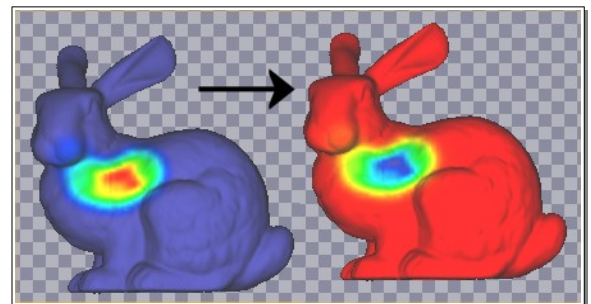
## *Normalize*

Normalizing a selection will rescale the selection values such that the maximum selection value ( assuming it's less than 100% selected ) will become fully selected, and the values in between will be rescaled accordingly.



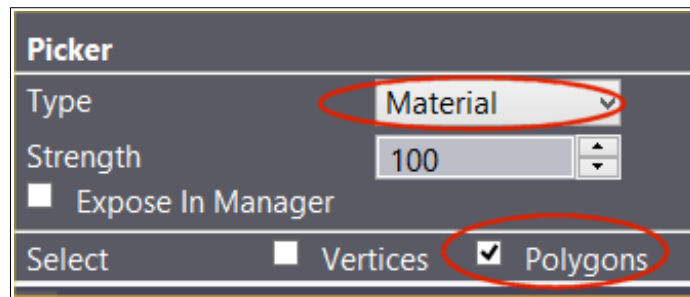
## *Invert*

Inverting a selection will make all of the unselected regions selected, the selected ones not, and everything in between will be adjusted accordingly.



## Hide Selected Surface

As the name implies, this option will hide the selected surface so it is not visible nor editable until it is shown again. For best results, you may wish to use a **Polygon Selection** ( see the tool window when a selection tool is active ) as it can more accurately determine exactly which polygons are hidden from view. For example, you can use the **Picker** tool, with the type set to **Materials**, and **Select.... Polygons** to accurately select and hide all polygons belonging to a specific material.



## Unhide Selected Surface

Unhide Selected Surface reveals all polygons that were previously hidden with the feature above. If there are **Display Groups** that are hidden, you will be prompted to reveal them as well ( or not ).

## Lock Selected Surface

Lock Selected Surface will lock the selected polygons such that most operations will not affect them ( e.g. painting, selecting, deforming ). The usage is exactly the same as for hidden surfaces ( above ) except you can still actually see the surface, but it is shielded from editing all the same.

## Unlock Selected Surface

Unlocks the surfaces previously locked using **Lock Selected Surface**. Also, if there are display groups that are currently locked, you will be prompted to unlock those as well ( or not ).

## Viewports Menu

The viewport menu is the central place to modify how the 3D viewports are displayed. You can alter the configuration ( number and arrangement of viewports ) the shading options, and a host of other features.

### Current Viewport Is...

This menu entry is passive ( doesn't do anything when you click on it ) and merely displays the name of the current ( active ) viewport. The current viewport is the one where the editing currently takes place in, and is usually the **Main** viewport unless you are using an advanced configuration.

### Configuration Menu

The configuration menu allows you to determine how the viewport(s) are arranged in the main window. Configurations include **Four Viewports ( on Large )**, **One Viewport**, **Two Viewports (Tall or Wide )**, **Three Viewports**, and **Four Viewports**. For an in depth discussion of viewport configurations, please see the Viewport Configurations tutorial.

#### *Four Viewports (One Large)*

Uses four (one large, three small) viewports to view and edit the object.

#### *One Viewport*

Uses only one viewport to view and edit the object(s).

#### *Two Viewports (Tall)*

Uses two tall viewports to view and edit the object(s).

#### *Three Viewports*

Uses three viewports to view and edit the object(s).

#### *Four Viewports*

Uses four (equally sized) viewports to view and edit the object(s).



## Display Mode

The Display Mode menu offers you a number of options as to “how” the 3D objects are displayed in the viewports. There are two main categories of display modes, **Normal** and **Special**. Normal display modes are meant for long term usage, like **Color Maps**, and Special display modes are meant to be toggled on an off on demand, in conjunction with the normal display modes.

The best example of a special display mode is the **Hot Selection View** which allows you to visualize the current selection color coded from blue to red through the spectrum to illustrate un-selected to fully selected values. You may want to toggle this on and off to see the current selection values, while you are also painting an object, in which case your **normal** display mode will be **Color Maps**, or **Bump Maps**, etc.

For more information, please see the Introduction to Viewport Display Modes tutorial.

The following are **Special Display Modes** designed to be toggled on and off to be used in conjunction with the **Normal** display modes.

### *Hot Selection View*

Shades the objects according to the selection strength. Use the **SHIFT-SPACE** hotkey to toggle the hot selection view.

### *Brush Tile View*

Shows the brush image tiled across all textured surfaces in the viewport. Used to illustrate exactly where the texture will appear on the object when painted.

### *Resolution Visualizer*

Helps you visualize the resolution of the maps in the project. It displays a colorful multi-level grid, down to the pixel level, which helps you detect resolution and UV issues instantly.

### *Quick Render View*

Allows you to view the object(s) with Displacement Maps, Bump Maps, etc. maps applied at real time. Use the **R** hotkey to quickly toggle back and forth. This is not meant to be a high quality renderer, rather, it allows you to quickly see the effects of

the bump, transparency, displacement maps, etc. while editing.

The following are **Normal Display Modes** ( see previous comments regarding special vs normal display modes ).

*Color Maps*

*Transparency Maps*

*Bump Maps*

*Displacement Maps*

*Specular Maps*

*Ambient Maps*

*Glossy Maps*

These display modes will render the chosen material channel onto the surface of the model for direct editing. For example, if you are editing transparency maps, you will see the greyscale maps that you are currently editing on the surface of the model, and not the transparent effect that they produce. For this, please see the Quick Render View section.

All painting operations will affect the same material channel that is currently being displayed unless otherwise specified in the **Paint Channels** panel of the tool window (when a Paint tool is being used ).

*Display Group Colors*

This display mode will illustrate the objects in the viewport with the color of the Display Group(s) that they belong to. If a polygon belongs to more than one Display Group, then the color of one will be automatically chosen, the current Display Group taking preference over others ( indicated by the red bar ).

## ***Material Colors***

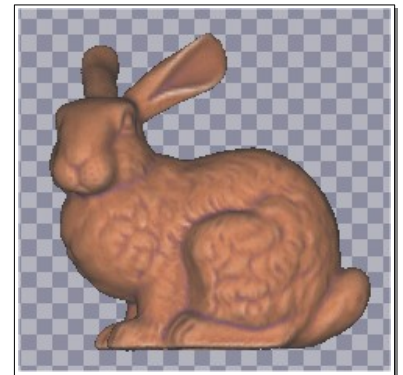
Enabling this option will result in the objects in the viewport being colored according to the material colors ( as defined in the Color channel ).

## ***Shiny Grey***

Enabling this option will result in the objects in the viewport being colored grey. Ideal for deforming where viewing textures may not be necessary. The Specularity improves the visibility of fine surface details, however, you may consider using the **Concave Shading** display mode for even better visibility of fine surface detail.

## ***Concave Shading***

The concave shading display mode was designed to emphasize subtle variations in the surface detail that may not be obvious from the lighting effects alone. It is highly recommended that you use this display mode often when creating morph targets.



## Shading Options

Contains various options for drawing the objects in the viewport, such as smoothing, wireframe, etc.

### *Smooth*

Draws the polygons with smooth shading (when lighting is enabled). This has no effect when lighting is disabled. When disabled, curved surfaces will appear to be “faceted”.

### *Wireframe Overlay*

Draws the outline of the polygons over the solid rendering. It is very useful when you need to see what the polygon topology/distribution looks like. The wireframe color can be changed via the **Viewports-General...** menu. You can use the **O** hotkey ( letter O, not zero ) to toggle the overlay on and off.

### *Vertex Overlay*

Draws the vertices over the solid rendering. It is very useful when you need to see what the vertex distribution looks like. The wireframe color can be changed via the **Viewports-General...** menu. You can use the **SHIFT-O** hotkey ( letter O, not zero ) to toggle the overlay on and off.

### *Use Lighting*

Simple lighting will be applied to the surface. The lighting is from a single source aligned with the current viewport angle. When disabled, the surface and textures will appear “flat” ( hence without depth ), so it can improve the texture visibility in the darker regions, but make it harder to visualize the 3d geometry. You can use the **G** hotkey to toggle the lighting on and off.

### *Texture Filtering*

Renders the texture maps using linear texture filtering. Disabling this feature lets you see individual pixels.

## Framing

The framing submenu allows you to frame, center or zero the current viewport, or all viewports as required. Framing is commonly used, however centering and zooming the viewports in this way may only be required in special case scenarios.

### *Frame Selection*

Adjusts the zoom and position of the viewport to fit the currently selected portion of the surface.

### *Frame Object*

Adjusts the zoom and position of the current viewport to fit the current object.

### *Frame All*

Adjusts the zoom and position of the current viewport to fit all of the objects in the current project.

### *Center X, Y, Z*

Centers the viewport for each of the X, Y and Z dimensions individually. Centering means that the viewport will be aligned with the object's center, and not necessarily the axis' in 3D space ( which is what zeroing does ).

### *Zero X, Y, Z*

Zeros the current viewport (world coordinates) of the X, Y and Z dimensions individually. This option is especially useful in conjunction with the "Mirror" options, for precise lining up of the viewport.



## General Menu ( Viewport )

The General menu provides various options that determine how the viewports are displayed.

### *Change Background Color 1 and 2*

Changes the background colors for the background grid.

### *Change to Solid Background Color*

Use this option to create a single colored background, instead of a checkered grid. You can revert to a grid by changing the two background colors individually, or choosing 'Revert to Default Background Colors'.

### *Revert to Default Background Colors*

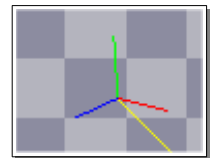
Change the background grid colors back to their default values, according to the current color theme (see Color Theme ).

### *Change Wireframe Color*

Changes the color of the wireframe overlay.

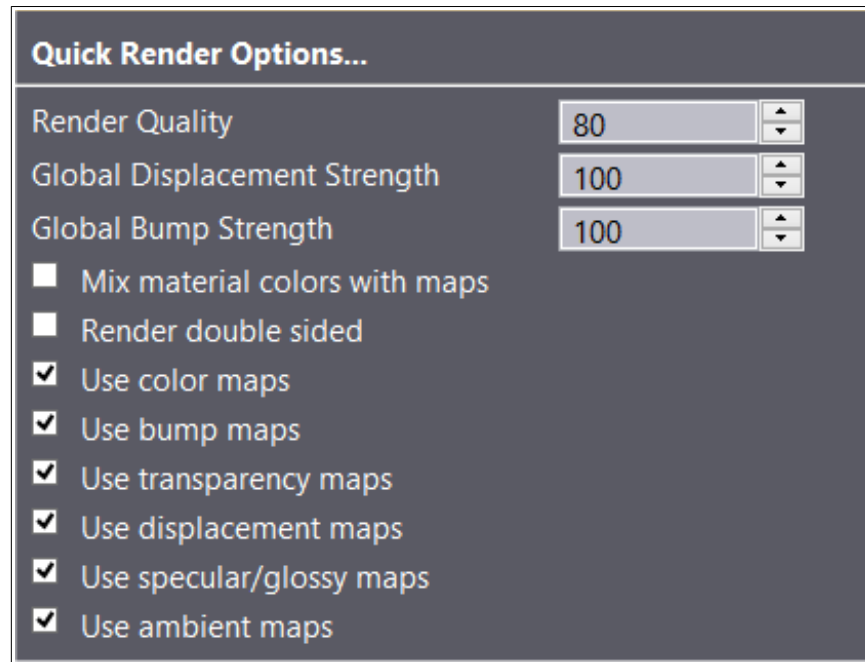
### *Display XYZ Axis*

Markers displaying the directions of the X, Y and Z unit vectors will appear in the viewport. They will appear at the origin  $\{0,0,0\}$  if it is in view, or be clamped to closest position near the edge of the viewport. The X axis is red, the Y axis is green and the Z axis is blue. If the origin is out of view, then a yellow line will point towards it.



## Quick Render Options

Quick Render allows you to see the result of the applied transparency, bump, displacement, etc. maps in real time. Please note that the Quick Render display mode is not a high quality renderer and it is not designed to create a final product.



### *Render Quality*

Determines how fine the detail will be rendered. Lower quality renders faster while higher quality renders with finer details.

### *Global Displacement Strength*

Increases/decreases the strength of all displacement maps. Helps to calibrate the displacement mapping to be consistent with other software packages.

### *Global Bump Strength*

Increases/decreases the strength of all bump maps. Helps to calibrate the bump mapping to be consistent with other software packages.

### *Mix material colors with maps*

Tints the color maps with the material colors for compatibility with other 3D programs whose renderer exhibits this behavior. It is recommended that you leave this option unchecked unless you have a good reason not to.

### ***Render double sided***

When this option is checked, all Backfacing polygons are rendered. Please note that individual objects may be rendered as "double sided" in the **Manager** by double clicking the object and setting the **Draw Double Sided** option.

### ***Use color Maps, Use bump maps, etc.***

To enable or disable the display of any of the supported material channels in the **Quick Render View**, check or uncheck these options.

## **Copy Current**

Copies the state of the current viewport. It can then be pasted to the same viewport ( after navigation for example ) or pasted to another unlocked viewport.

## **Paste Current**

Pastes the previously copied state into the current viewport, which may or may not be the same viewport that was initially copied.

## **Copy All**

Copies the state of all of the viewports.

## **Paste All**

Copies the state of all of the viewports.

## **Tools Menu**

The tools menu contains all of the tools in Blacksmith3D in menu-text form that are also accessible as icons in the left panel. For more information on any of the tools and categories, please see their individual reference entries later in this chapter.

## **Help Menu**

The help menu contains useful links to support materials, the “About” window, and the software registration for activating the full licensed version of this software.

### **Online Help**

Opens a page in your default web browser containing links to support materials such as this manual.

### **Check For Updates**

This option will check the website for available updates, and automatically download and apply them. Blacksmith3D will automatically check for updates periodically, but you can do it here on demand.

### **Tutorials**

Opens a page in your default web browser containing links tutorials to help get you started using Blacksmith3D.

### **Purchase Full Version**

Opens a page in your default web browser where you can purchase a license key for Blacksmith3D.

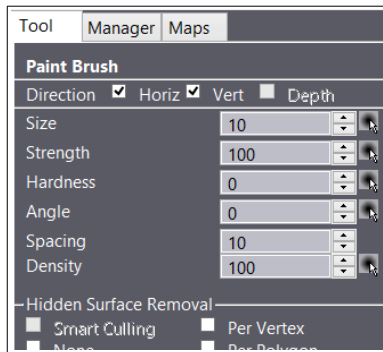
### **Register**

Opens the registration window where you can enter your newly purchased registration key, along with you personal information to register the software.

### **About**

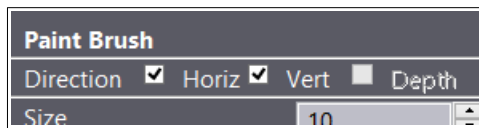
Opens the software splash screen displaying information such as the current software version number.

## Tool



The Tool tab is where you will find the parameters for controlling how the current tool behaves. The content of this window will change depending on what tool is currently active. In this section we will describe all of the common parameters found in the tool window, and ones that are specific to a particular tool can be found in that tool's section in the manual.

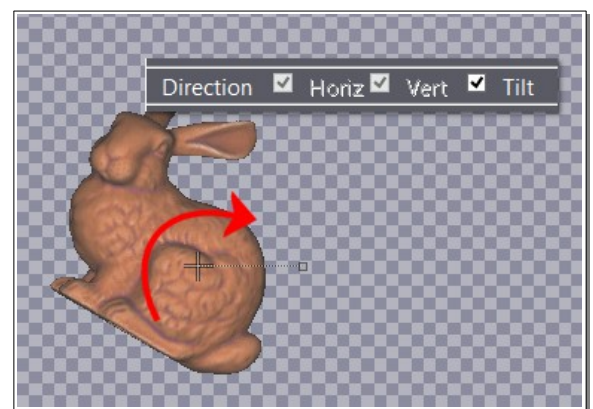
## Direction



The direction controls allow you to determine ( or limit ) the direction that a tool acts in, relative to the space of the viewport. For example, the horizontal direction ( Horiz )

is always “left-to-right” in the viewport, regardless of the viewing angle. Likewise, the vertical direction ( Vert ) is always “up-and-down” in the viewport, and Depth ( or Tilt ) is always “in-and-out” of the viewport.

It is important to note that for rotational tools, Depth is replaced with Tilt, and that means the rotation takes place around the axis that is coming out of the viewport, so it rotates “in the plane” of the viewport. Also, Depth or Tilt are **exclusive** directions, so they cannot be combined with Horiz or Vert.





## Common Parameters for Brushes

### *Size*

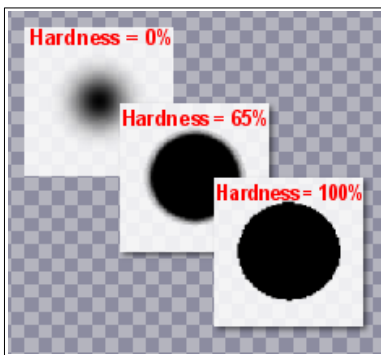
Determines the size of the tool in the current viewport. This value is a percent, so 100% means the tool is the full size of the viewport.

### *Strength*

The strength determines “how much” the tool will affect it's target. For example, a selection tool with the strength set to 50% will result in the surface being “half selected”. Likewise, a paint brush with the strength set to 50% will have translucent effect ( like water colors ). Finally, a deformer ( chisel or hammer ) will deform 50% less than it would at full strength.

When using chisels, it is often desirable to use a small strength value, and slowly build up the deformation effect with multiple strokes. Likewise, when painting with the Color Adjustment Brush or the Light Adjustment Brush, using a weaker strength and slowly building up the effect is recommended in many cases.

### *Hardness*



Determines how hard (or soft) the edges of the tool will be. In most cases, this refers to the edges of the **Brush Shape**, but for tools like **Box Select** and **Lasso Select**, this acts like a “feathering” parameter found in 2D painting applications.

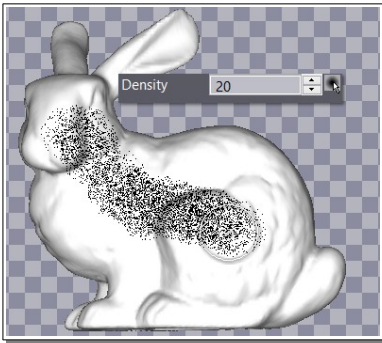
### *Angle*

Rotates the brush shape by the given angle ( in degrees ) from 0 to 360. To adjust the angle visually, click on the **Adjust** icon immediately to the right of the parameter, and then click and drag in the viewport.

## Spacing

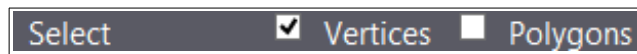
Used for paint brushes only. Determines the spacing between each impression of the **Brush Shape** for a brush stroke. The smallest value of 0 yields a very smooth, continuous brush stroke. Larger values result in a noticeable gap between each impression of the brush shape.

## Density



Used for paint brushes only. When the density is less than 100%, the resulting paint stroke will be filled with tiny dots, similar to an “air brush”. The lower the density, the less dots appear.

## Select



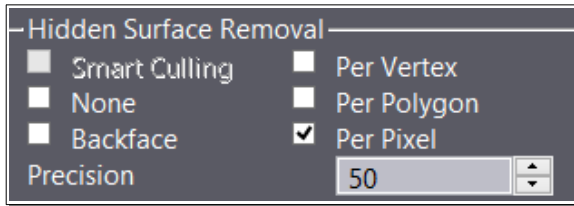
For selection tools only. This option allows you to toggle between **Vertex** based selections and **Polygon** ones. For most operations, Vertex selections are recommended (e.g. painting, deforming). **Polygon** based selections are only recommended when you need to select polygons for assigning them to **Display Groups**, hiding or locking via the **Edit** menu, or creating **Materials** or **Groups**. This is so you can precisely determine which polygons are being assigned since it may not be so clear when using vertex based selections. Also, it is recommended that you set **Hardness** to 100% whenever using polygon based selections.

## Lock



For deformers only (hammer and chisels). Prevents any deformation from acting in the X, Y and/or Z directions. Please note that this takes place in the coordinate space of the object, and not the relative space of the viewport. This is indicated by the use of X Y and Z, instead of Horiz, Vert and Depth.

## Hidden Surface Removal



Determines which portions of the surface are omitted from a painting, selection or chisel operation.

**None** - No culling occurs. Paint brush strokes and selections go 'through' the object.

**Smart Culling** - Available for Selection Brushes and Chisel Deformers. Intelligently selects neighboring vertices/polygons based on the brush shape and the object's topology. Optimized for speed, making it easier to use chisels or selection brushes on high resolution objects.

**Backface** - is a simplistic method that is only recommended for certain, specialized situations. Otherwise, it is recommended that you use Smart Culling, Per Vertex or None. The polygons that are facing away from the viewport are omitted and the ones facing toward the viewport are included in the brush operation. When using vertex selections, the vertices that are shared between forward facing and back facing polygons are NOT culled, and are therefore editable.

**Per Vertex** - Each vertex is tested for it's visibility. If the vertex is obscured by another portion of the surface, then it is culled. Works best with moderate to high polygon models. Low polygon models can be Subdivided ( see Utility Tools) before painting to compensate for this, OR use **Per Pixel** when painting.

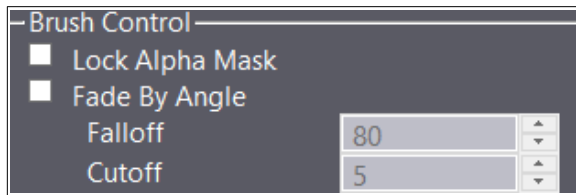
**Per Polygon** - This culling method is identical to the 'Per Vertex' method, with the exception that if any vertices on a given polygon are culled, then the entire polygon is considered to be culled. It is highly recommended that you use this culling type when blurring, smudging, etc. since the paint may spill into partially hidden geometry, causing undesired effects. This is also especially useful for preventing color spillage on lower polygon objects, however subdividing low polygon objects is still highly recommended.

**Per Pixel** - For painting tools only, Per Pixel will cull any pixel (on the texture maps that you are painting on) based on it's visibility. Because overlapping surfaces can cause some ambiguity in the depth calculations, the **Precision** parameter will allow you to make it more or less sensitive.

**Precision** – For use with **Per Pixel**. Higher values make the hidden surface removal more precise. Lower values make the hidden surface removal more forgiving, which

may result in bleed-through for closely overlapping surfaces.

## Brush Control



Provides options that alter the way the current brush behaves. This applies to selection brushes, paint brushes, and chisels.

**Lock Alpha Mask** – For paint brushes only. Locking the alpha mask allows you paint over a section without altering the alpha mask values. For example, on an Image Map Layer, you can paint the shape of a decal, then select Lock Alpha Mask, and proceed to texture that decal without losing the shape.

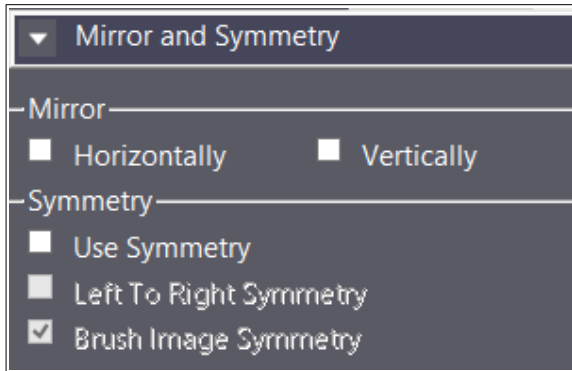
**Extra Soft** – For selection brushes only. Makes each selection extra soft. It's like pressing the **S** key once after selecting. Works best for moderate to high polygon objects and not so good for low polygon objects. Not recommended for precise editing.

**Fade By Angle** - Causes the strength to become weaker as the angle between the surface and the viewing plane is greater. Helps prevent 'stretch marks' from appearing while painting textures. Using and understanding this feature is extremely important. It seems simple enough, but using it strategically can save you countless hours of time due to its ability to rapidly texture models so they look good from all angles.

**Falloff** - Determines how quickly the paint stroke or selection will fade as the angle (between the surface and the viewport plane) increases.

**Cutoff** - Determines the minimum angle for the fading effect. Lower values are more forgiving and higher values are less so.

## Mirror and Symmetry



Contains options for creating symmetric selections and paint strokes. It is important to note the difference between mirror and symmetric options.

**Mirror** - When using the mirror options, each brush stroke, selection, etc. will be duplicated horizontally and/or vertically on the opposite sides of the viewport. It is therefore important to take note of the positioning and orientation of the viewport.

**Horizontally** - Brush strokes will be mirrored in the horizontal direction. Effect is relative to the viewing position and angle. Can be combined with **Vertically**.

**Vertically** - Brush strokes will be mirrored in the vertical direction. Effect is relative to the viewing position and angle. Can be combined with **Horizontally**.

**Symmetry** - If the objects in your project have been constructed to be symmetrical, then you can edit one side of the object, and the operation will be duplicated on the other side, regardless of the viewport's position and orientation. The symmetry axis is the "X" axis by default, but that can be changed in the "Object Properties" section in the Manager. Some allowances are given for objects that are not perfectly symmetrical, however, unexpected results may occur if the object is not very symmetric.

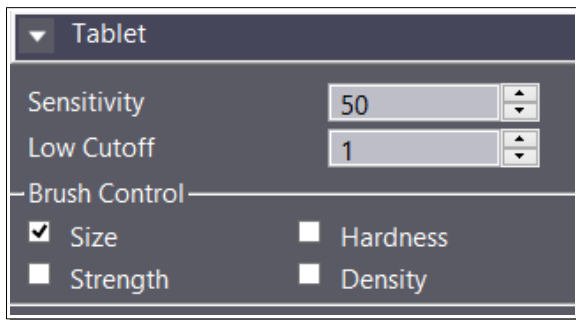
Not all tools can be used with mirror and/or symmetry. The options will be disabled if they are not compatible with the current tool.

**Use Symmetry** - Enables symmetric operations (if the current tool supports it).- For painting, selections and deformations, the vertex/polygon structure of the object must be designed symmetrically with a definite center line. **Per object symmetry settings** (e.g axis of symmetry, offset, etc.) are located in the 'Objects' section of the 'Manager', by double clicking the desired object.

**Left to Right** - By default, the symmetry of the object goes from the "right" to "left". When this option is enabled it will be reversed, from left to right. Please note that we use the terms "Left" and "Right" loosely here since the object's true left and right depends on which angle you are viewing the object from.

**Brush Image Symmetry** - When enabled, the applied **Brush Image** will appear symmetric on the object(s). When disabled, even though the brush stroke itself is symmetric, the applied brush image will not be.

## Tablet



Contains options using a pressure sensitive drawing tablet. Please note that for Windows, the drawing tablet must have a WinTab compatible driver.

**Sensitivity** - Determines how sensitive the pressure read from the drawing tablet should be. Please note that this setting is different from the sensitivity setting that may be associated with your hardware driver.

**Low Cutoff** - Represents the minimum pressure (in percent) required for applying paint to an object. Especially useful for preventing accidental paint strokes while gliding the pen across the tablet, which can cause short but distracting delays.

## Brush Control

This section lets you determine what aspects of the paint stroke are affected by the pressure. They can be used exclusively or be combined ( e.g. Strength and Hardness )

**Size** - The input pressure varies the apparent size of the brush stroke.

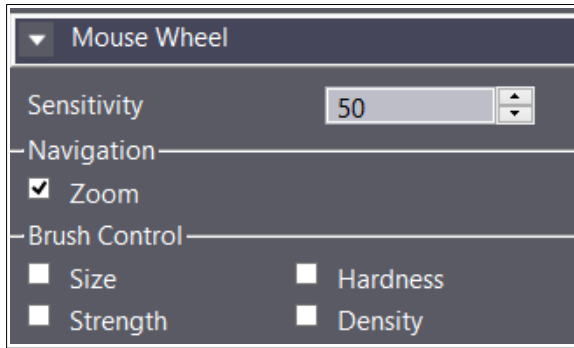
**Strength** - The input pressure varies the strength of the brush stroke.

**Hardness** - The input pressure varies the hardness of the brush stroke.

**Density** - The input pressure varies the density of the brush stroke.



## Mouse Wheel



Contains options for assigning actions to the mouse wheel, like viewport zoom, brush size, etc.

**Sensitivity** - Determines how sensitive the changes made by the mouse wheel are. e.g. If the mouse wheel is set to adjust the tool strength, a lower sensitivity setting will result in a greater change in the strength for each mouse wheel 'tick' while a greater value results in a smaller change for each 'tick'.

**Navigation - Zoom** - Using the mouse wheel will result in the viewport zooming in or out.

## Brush Control

Contains options for using the mouse wheel to control brush parameters.

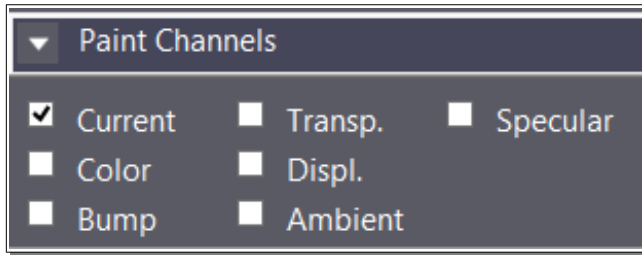
**Size** - The mouse wheel will increase or decrease the 'Size' parameter of the current tool (if applicable).

**Strength** - The mouse wheel will increase or decrease the 'Strength' parameter of the current tool (if applicable).

**Hardness** - The mouse wheel will increase or decrease the 'Hardness' parameter of the current tool (if applicable).

**Density** - The mouse wheel will increase or decrease the 'Density' parameter of the current tool (if applicable).

## Paint Channels

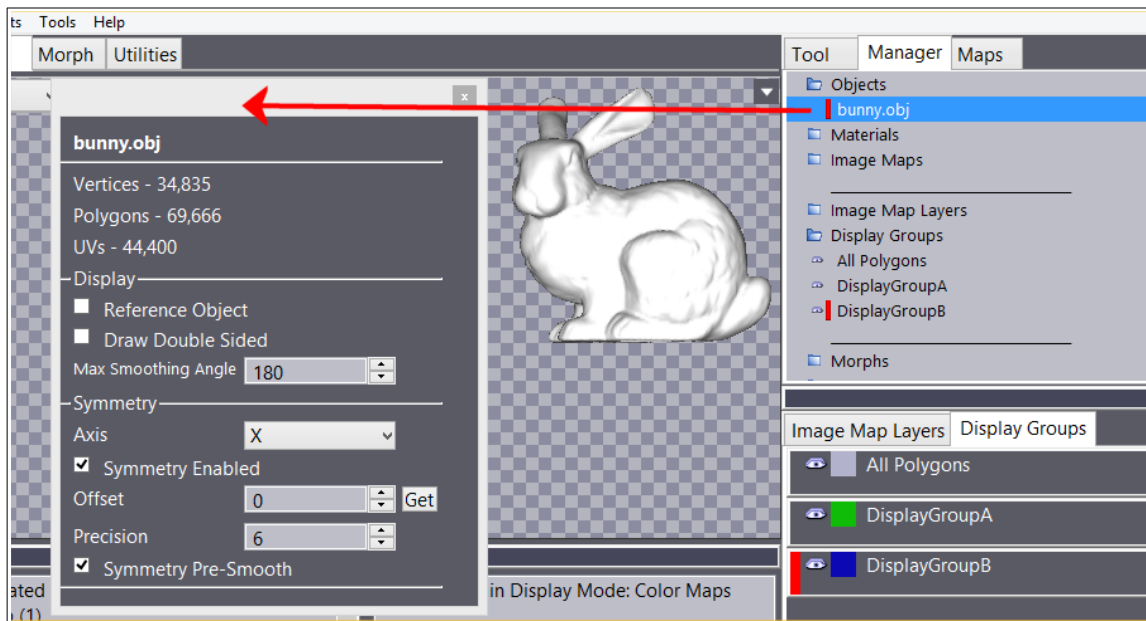


Determine which channels (e.g. color, bump, etc.) are affected by a paint stroke. By default, only the currently displayed channel will be affected. Multiple channels can be painted on simultaneously (e.g. color and bump,

bump and displacement, etc.). **This is a legacy feature and is only recommended for advanced users.**

## Manager

The organizes all of the elements of your project. It is presented in the form of a tree, where each folder or branch can be expanded by double clicking to reveal it's contents. Individual items can be double clicked to invoke a popup window containing any special options or information associated with the item. In short, this is where all of you “stuff” lives.



## Objects

Contains all of the objects loaded in the current project. Double click any object to reveal it's information and special settings in a pop-up window.

### *Vertices, Polygons and UV's*

Displays the number of vertices, polygons and UV's that are contained in the 3D object.

### *Reference Object*

When **Reference Object** is checked, the object has a few special properties which make it useful as a helper object in the project, rather than an object you are actually editing. First of all, it's display mode will be forced to **Color Maps** regardless of the current viewport setting. This is useful for photo references that you want to display all the time, regardless of the viewport settings. Second is that most tools will not affect it,

such as paint brushes, deformers, etc. Again, it is because the object is intended to be used as a reference and we do not want to affect it.

### *Draw Double Sided*

Backfacing polygons will be drawn in the viewports. Backfacing polygons will be treated as front facing, so they can be selected and painted on if they are visible in the viewport.

### *Max Smoothing Angle*

Determines the maximum angle ( in degrees) for smoothing the normals on the surface. 89 degrees is recommended for rigid, low polygon models. 180 degrees recommended for smooth 'organic' shapes. Values greater than 89, but less than 180 are not typical. Only set them in this range for special cases when you are sure that you really need it.

### *Symmetry Axis*

Specifies which axis will serve as the axis of symmetry (X, Y, or Z). In most cases, the axis of symmetry will be X.

### *Symmetry Offset*

Offsets the plane of symmetry by this amount from the origin. Used to compensate for objects that are not perfectly centered at the origin. To get a specific value directly from the object, select a few vertices on the center line ( and only on the center line ) and click the **Get** button.

### *Get*

Get's Symmetry Offset From Selection . Select at least one vertex on the object's center line. Click this button to auto-calculate the appropriate symmetry offset

### *Precision*

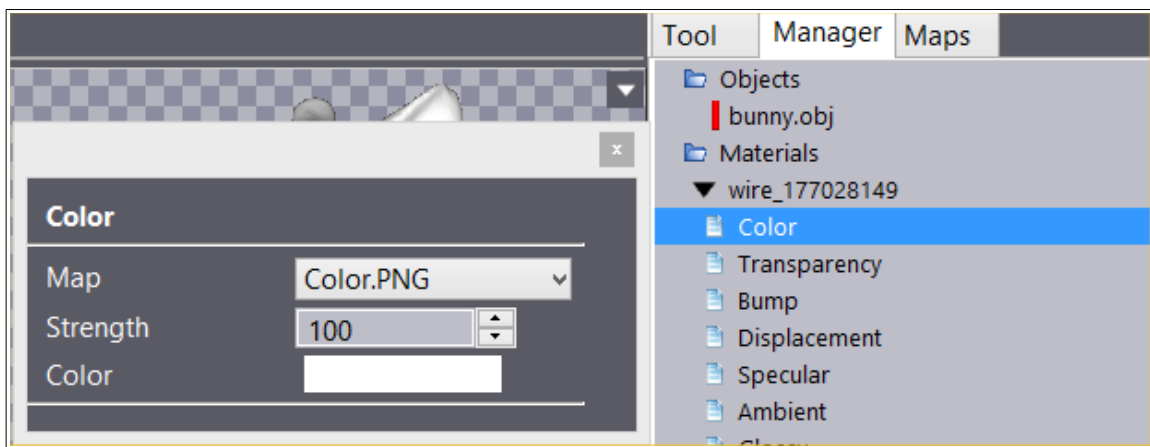
This value determines the number of decimal places considered when determining if the vertex is matching the corresponding vertex on the 'left' or 'right' side. Used for troubleshooting less than perfectly symmetric objects. Higher values are more precise but may fail to match-up a symmetric pair of vertices, while lower values are more forgiving, but could possibly mismatch a pair of vertices.

### *Symmetry Pre-Smooth*

This option will internally smooth the object before performing the symmetry calculations. This helps to compensate for some special cases near the center line. It is recommended that you leave this option **unchecked** unless you have a good reason to believe that it will help for a specific case.

## **Materials**

The materials folder contains the definitions for all of the materials in the project. Each material itself is presented as a folder, since it contains material channels such as **Color**, **Bump**, etc. Each of those channels can be double clicked so they may be modified.



### *Map*

Assigns an image map to the material channel. Image maps must already be loaded into the project via **Menu-File-Import**, or by dragging and dropping them into the viewport.

### *Strength*

Determines how strong the effect of the map is.

### *Color*

For material channels that are color based, this provides a base color in the absence of an **Image Map**.

### *Offset*

For displacement maps only. This value determines where the zero-displacement value should be. When it's set to 0%, then black is the zero displacement and white is positive

outward displacement ( with no negative displacement ). When it is set to 50%, then grey is zero displacement, black is negative displacement and white is positive displacement. Finally when it is set to 100%, white is zero displacement, and black is the maximum amount of negative displacement ( with no positive outward displacement ).

## Image Maps

In the Image Maps folder, you will find all of the maps loaded into the current project listed by their text names. The thumbnail icons can be viewed in the **Maps** tab next to the **Manager**. Double clicking a map shows a larger thumbnail along with it's basic information in a pop-up window. **Right clicking** on an image map reveals the context menu which has more options for editing whole maps.

### *Create New Map*

Creates a new texture map. You will be presented with a dialog window where you can specify the name and dimensions of the newly created map. Please note that the file extension must be present in the name ( e.g. PNG ) so Blacksmith3D knows what format to export it as when the time comes.

### *Import*

Import an image file to be used as an image map. This can also be done via **Menu-File-Import**.

### *Export*

Exports the highlighted maps as image files, in the file format that is specified by the extension present in the name ( e.g. MyTexture.PNG ).

### *Import Into Current Layer*

Imports an image file into the current layer of the specified image map. This is useful for reconstructing layers from 2D painting programs, and for a variety of other uses.

### *Export Current Layer*

Exports an image file using only the current layer of the specified image map.



### ***Resize***

Resizes the highlighted image map to the specified dimensions.

### ***Clear***

Clear the highlighted image maps to the secondary color, and sets the alpha to 0 if at least one image map layer is present. Hold the ALT key to clear so Alpha is fully opaque even if an image map layer is present.

### ***Delete***

Deletes the highlighted image maps from the project. Warning, this cannot be undone.

### ***Rename***

Allows you to rename the specified image map, making sure that you also specify a supported image file extension.

### ***Invert Colors***

Inverts the colors in the map, such that black becomes white and white becomes black. The effect is done separately for each RGB channel, so the result may look like a photo negative if non-grey colors are used.

### ***Normalize***

This option is only recommended for greyscale images. Rescales the image in such a way that the darkest color in the image becomes black, and the lightest color becomes white, and the intermediate shades are adjusted accordingly. Useful for editing bump or displacement maps.

### ***Convert To Greyscale***

The selected maps will be converted to greyscale. Pixel intensity is determined by averaging the RGB values. Please note that the image could still be painted using non-grey colors after this conversion as it still remains an RGB image.

## Image Map Layers

Although the Image Map Layers have their own tab at the bottom-right corner of the main window, they also exist here in the manager. It is useful to access them in the manager when you would like to perform operations on multiple items at once. Please see Image Map Layers for more details.

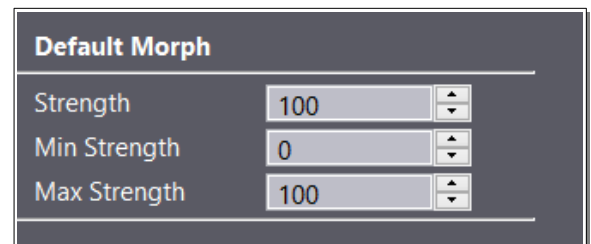
## Display Groups

Although the Display Groups have their own tab at the bottom-right corner of the main window, they also exist here in the manager. It is useful to access them in the manager when you would like to perform operations on multiple items at once. Please see Display Groups for more details.

## Morphs

The morph folder contains all morph targets present in the current project. If you have multiple objects in the scene, then each morph can potentially deform any of them, since this is consistent with Blacksmith3D's mult-object workflow. However, the actual data will only be created when an object has been deformed. So, if you do not want an object to be affected by a morph, then simply do not deform it when the morph is active.

Double clicking a morph will invoke it's properties window.



## ***Strength***

Sets the strength of the morph. A setting of 50 percent results in the morph being displayed at half strength and 100 percent results in the morph being displayed at full strength. Note that a values larger than 100 (or less than 0) percent can be used, resulting in an 'oversampling' effect ( the Min/Max Strength settings may have to be adjusted to allow values outside the {0,100} range).

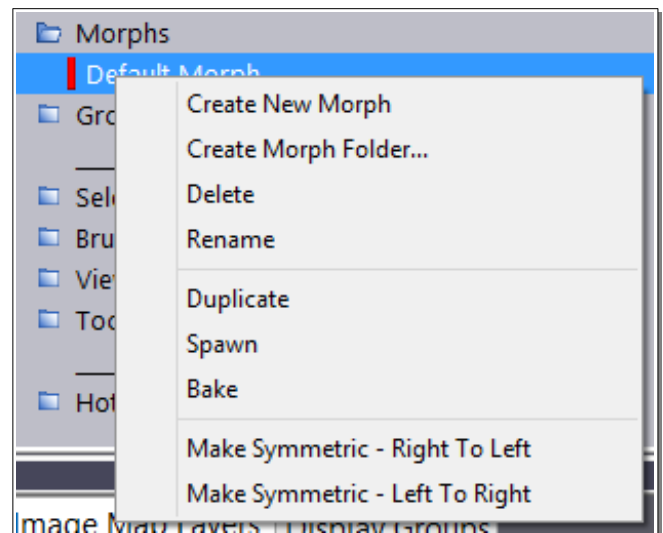
## ***Min Strength***

Sets the minimum value that will be accepted in the Strength box. The default value is 0%, however it can be less than zero for negative deformations.

## ***Max Strength***

Sets the maximum value that will be accepted in the Strength box. The default value is 100%, however it can be greater than 100% for oversampled deformations.

**Right Clicking** on any morph, or the Morphs folder will invoke the context menu, which contains a the functions for managing them.



## ***Create New Morph***

Creates a new ( empty ) morph target.

## ***Create Morph Folder***

Creates a new folder for organizing morphs. Morphs can be dragged and dropped into folders.

## ***Delete***

Delete the highlighted morph(s) in the manager.

### *Rename*

Renames the highlighted morph in the Manager.

### *Duplicate Morph*

Creates a duplicate of the highlighted morph(s). The strength of the newly created morph(s) will be set to 0% to prevent a “double deformation” effect in the viewport.

### *Spawn Morph*

Creates a new morph target which combines all of the current morphs (with their relative strengths).

### *Bake Morphs*

Transfers the highlighted morph deformations with their current strength settings to the base vertices of the object, effectively making the deformations permanent.

### *Make Symmetric - Right To Left*

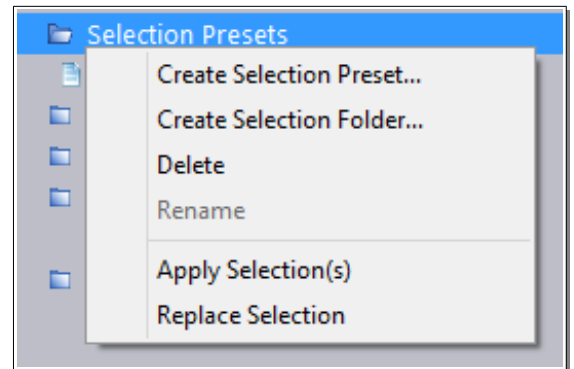
Copies the **selected portions** of the right side of the current morph to the left side. Please note that we use the terms "Left" and "Right" loosely here since the object's true left and right depends on which angle you are viewing the object from. To affect the whole object, press CTRL-A to Select All beforehand.

### *Make Symmetric - Left To Right*

Copies the **selected portions** of the left side of the current morph to the right side. Please note that we use the terms "Left" and "Right" loosely here since the object's true left and right depends on which angle you are viewing the object. To affect the whole object, press CTRL-A to Select All beforehand.

## Selection Presets

The Selection Presets folder allows you to store and reuse selections. **Right Clicking** on any selection preset, or the Selection Presets folder will invoke the context menu, which contains the functions for managing them.



### *Create Selection Preset*

Stores the current selection as a preset for future reuse.

### *Create Selection Folder*

Creates a new folder for organizing selections. Selections can be dragged and dropped into folders.

### *Delete*

Delete the highlighted selection preset(s) in the manager.

### *Rename*

Renames the highlighted selection preset in the Manager.

### *Apply Selection(s)*

Apply the highlighted preset selection(s) to the object(s). The applied selections will be added to the current selection, so if you want it to be exclusive, press CTRL-U to clear the selection beforehand.

### *Replace Selection*

Replaces the contents of the highlighted preset selection with the current selection (as seen in the viewport).

## Brush Tile Presets

Brush Tile Presets allow you to store the current state of the Brush Tile Setup for future reuse. These presets can be extremely useful in cases where you may be toggling back and forth between multiple **Brush Images**, and custom tile setups. **Right Clicking** on any Brush Tile Preset, or the Brush Tile Preset s folder will invoke the context menu, which contains the functions for managing them.

### *Create*

Creates a new Brush Tile Preset based on the current settings. This includes the **Brush Image** and the **Brush Tile Setup** information.

### *Delete*

Delete the highlighted Brush Tile Preset(s) in the manager.

### *Rename*

Renames the highlighted Brush Tile Preset in the Manager.

### *Apply*

Applies the highlighted Brush Tile Preset in the Manager, setting the **Brush Image** and **Brush Tile Setup** to the state they were in when the preset was created.





## Viewport Presets

Viewport Presets allow you to store the current state of the viewports for future reuse. These presets can be extremely useful in cases where you may be toggling back and forth between viewing orientation and viewport configurations. **Right Clicking** on any Viewport Preset, or the Viewport Presets folder will invoke the context menu, which contains the functions for managing them.

### *Create*

Creates a new Viewport Preset based on the current settings. This includes the viewing orientation and the viewport configuration information.

### *Delete*

Delete the highlighted Viewport Preset(s) in the manager.

### *Rename*

Renames the highlighted Viewport Preset in the Manager.

### *Apply*

Applies the highlighted Viewport Preset in the Manager, setting the viewing orientation and viewport configuration to the state they were in when the preset was created.

## Tool Presets

Tool Presets allow you to store the current state of the current tool for future reuse. These presets can be extremely useful in cases where you may be toggling back and forth between a few tools, and you require different settings ( e.g. strength ) for each. **Right Clicking** on any Tool Preset, or the Tool Presets folder will invoke the context menu, which contains the functions for managing them.

### *Create*

Creates a new Tool Preset based on the current settings. This includes Strength, Size, Hidden Surface Removal, etc.

### *Delete*

Delete the highlighted Tool Preset(s) in the manager.

### *Rename*

Renames the highlighted Tool Preset in the Manager.

### *Apply*

Applies the highlighted Tool Preset in the Manager, setting the tool settings to the state they were in when the preset was created. For further control over what settings are recalled, double click the preset and change the options in the pop-up window.

**Double clicking** a tool preset will invoke a pop-up window that allows to to customize what settings are recalled when using the specific Tool Preset.

### *Fade By Angle*

When this option is checked, Fade By Angle settings will be recalled to the state they were in when the preset was created.

### *Hidden Surface Removal*

When this option is checked, Hidden Surface Removal settings will be recalled to the state they were in when the preset was created.

### ***Lock Alpha Mask***

When this option is checked, the Lock Alpha Mask setting will be recalled to the state it was in when the preset was created.

## **Hotkeys**

The Hotkeys folder contains two subfolders, **User Editable** and **Reserved**. The User Editable folder contains all of the hotkeys that have been created by the user ( or created by default ), but can otherwise be deleted or reassigned to other functions. The Reserved folder contains the hotkeys that cannot be changed as they are a standard part of the Blacksmith3D workflow.

**Right Clicking** on a user editable hotkey provides the following options...

### ***Delete***

Delete the highlighted hotkey(s) in the manager.

### ***Reset All To Default***

Resets all of the hotkeys back to their default state, and deletes all user created hotkeys.

## Maps Tab



The Maps tab is where all of the Image Maps are visible in thumbnail form. Right clicking on any of the thumbnails invokes the context menu which contains a variety of functions for modifying the maps, as described in the Image Maps section of the Manager. The only functional difference between using the Maps tab vs. the Manager for editing maps is that you can multi-highlight items in the manager to act on multiple maps when applicable ( e.g. deleting maps ), while in the Maps tab, you can only modify the map that you are right clicking on. For more information, please see Image Maps.

## Navigation Tools

The underlying philosophy of Blacksmith3D's navigation tools is to feel **natural**, **familiar** and **obvious to use**. Anyone who has used more than one 3D application, knows that many software packages have designed their navigation to be “different”, and something as simple as rotating a view may involve the use of a unique hotkey, a middle mouse button (if you even have one) or something else that you have to dig through the manual to figure out.

Therefore, to avoid unnecessary learning curves, the navigation system in Blacksmith3D is **modeled after standard 2D painting applications**, making it more familiar and **consistent** to the average graphic artist.

### Pan View



enables you to move the view up, down, left and right simply by clicking and dragging the viewport. There should be few or no surprises here. You can limit the direction of the motion using the **Horizontal** and **Vertical** checkboxes.

### Zoom View



by default, behaves more like a traditional zoom found in most 2D paint applications. To zoom in, **simply drag a box** around the area, which you would like to zoom. To zoom out, hold the **ALT** key and click in the viewport to zoom out a step.

If you prefer a similar zoom to the one found in many 3D applications, then enable the **Continuous Zoom** option. When enabled, **dragging up** and **down** in the viewport results in **zooming in** and **out**. Note, when **Continuous Zoom** is enabled, the **Auto-Center** option becomes available (see more about this option in the **Rotate View** Section).

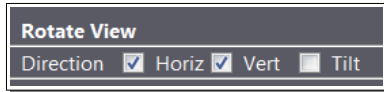
### Rotate View



allows you to change the viewing angle of the viewport as you may expect. There are however a few details that you may not expect. The first is that all rotations are **relative to the viewport**. That means, you never have to consider which direction the x, y or z axis are. When you click and drag left,



right, up or down, that is the direction in which it will rotate. Period.



By default, the **Horizontal** and **Vertical** directions are mapped to the left/right and up/down directions. By checking the **Tilt** checkbox, then the rotation takes place along the axis coming out of the viewport. For your convenience, you can use the **CTRL-D** hotkey to toggle the **Tilt** direction on or off.

### *Auto-Center*



When this feature is enabled, the point on which you initially clicked when rotating, will drift to the center of the viewport as you rotate, hence becoming the center of attention. This removes the need to pan the view manually after rotating.

## Refresh All Viewports



Press the F5 hotkey to refresh just about everything in Blacksmith3D. It is meant to be a fail safe in the case where the viewports have not been properly updated. In a perfect world, we would not need such a feature, but in the real world, it can come in handy. **Simply think of it as the refresh button in your web browser.**

## Frame Viewports



centers and zooms wither the current viewport ( left icon ) or all viewports ( right icon ).

- If there is a current selection, then it will be framed in the viewport.
- Otherwise, all visible objects will be framed.
- Hold the SHIFT key to frame all objects, regardless of the current selection

## Transform Tools

are useful when you have multiple objects in the scene, and you need to **move**, **rotate** or **scale** them in relation with each other, without affecting the actual geometry. They may be especially useful for manipulating **Photo References**, which can be **dragged and dropped** from your operating system's file system directly into the viewport.

When one of these tools is active, simply clicking on an object will automatically select the whole thing, since you cannot transform part of an object in this way. To transform multiple objects, simply hold the **SHIFT** key and click on them to add them to the selection. Likewise, hold the **ALT** key to remove an object from the selection.

### Move Object



- Move the selected objects in the 3D space without affecting the base vertices

- Used for arranging objects in project space and not to mistaken for the 'Move' deformer or the 'Pan View' tool.

### Rotate Object



- Rotates the selected objects in the 3D space without affecting the base vertices

- Used for arranging objects in project space and not to mistaken for the 'Rotate' deformer or the 'Rotate View' tool.

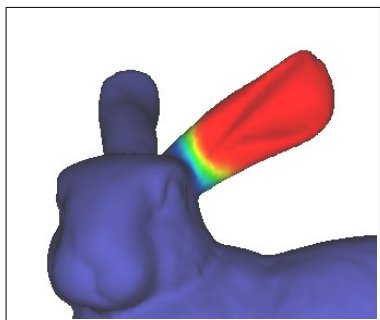
### Scale Object



- Scale (resize) the selected objects in the 3D space without affecting the base vertices

- Used for arranging objects in project space and not to mistaken for the 'Scale' deformer or the 'Zoom View' tool.

## Selection Tools



The selection tools provide the user with a mechanism for creating **Hot Selections**, otherwise known as *soft selections*. These tools provide a way of selecting vertices or polygons **with value**. So some vertices can be more selected than others. This effect is illustrated using the heat analogy, where cold (unselected) vertices are blue, warm are yellow and the hottest are red.

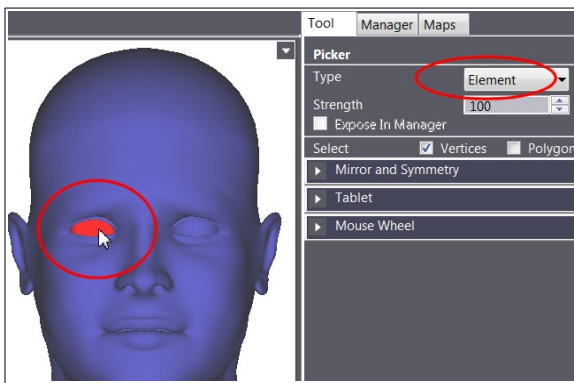
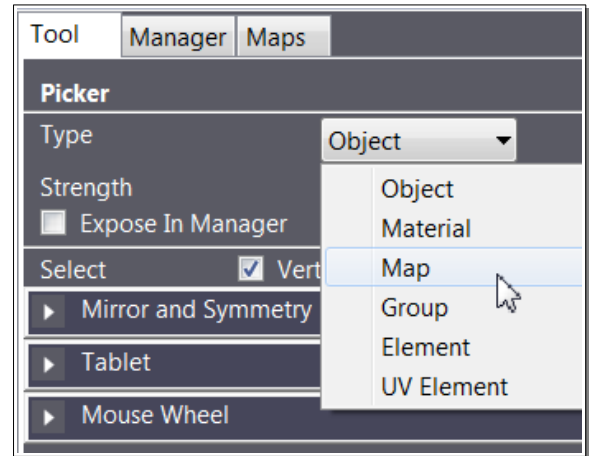
## Picker



enables you to select whole sections in a single click, as defined by the **Type** parameter. By default, the **Object** type is enabled, so clicking on an object selects all of it. Next is the **Material** type, which selects all portions of the surface that are associated with the same material as the polygon that you clicked on. When this type is active, the **Popup Material Window** option is available, which if checked, will show the material window after clicking. This is a quick and easy way of locating materials so you can modify their settings.

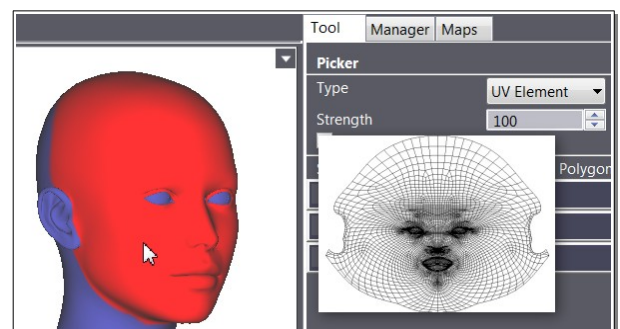
The **Map** type is similar to **Material**, except it selects all portions of the surface associated with the map, which span over several materials. So if your object has 20 materials, and 10 of them have the same texture map, then the surfaces belonging to those 10 materials will be selected.

The **Group** type will select all portions of the surface associated with the group that you clicked on. These are the “groups” that are defined in the original OBJ file, and can also be created/edited in the **Manager**.

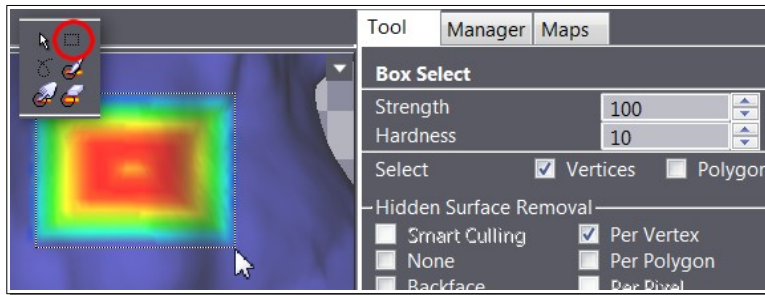


The **Element** type selects all portions of the object that are connected to the point that you clicked on. For simple objects, this will mean the whole object. However, some objects have segments that are completely detached from the others. For example, many character models have the eyeballs that are separate elements from the rest of the object.

Likewise **UV Element** selects all portions of the object that are connected in UV space, which is not necessarily the same connected surface as in XYZ space.



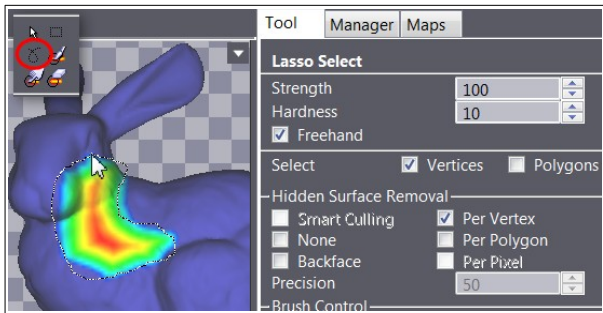
## Box Select



selects rectangular regions of the surface, similar to what you would expect from a 2D paint application, with the exception that you are selecting **vertices** or **polygons** and not individual pixels. The **Strength** parameter controls the magnitude of

the selection, while the **Hardness** parameter acts much like the **feather** option you may be familiar with, providing the selection with a softer falloff.

## Lasso Select

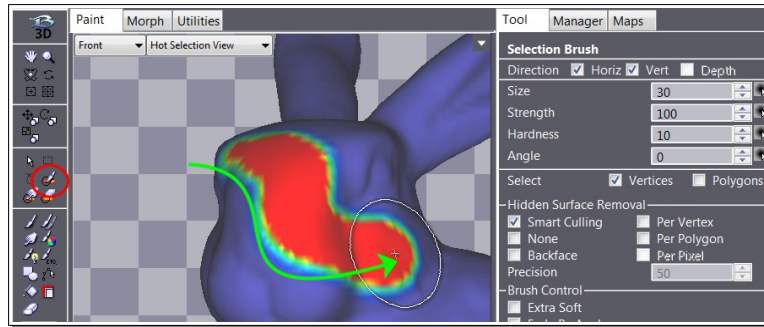


behaves exactly the same way as the **Box Select** tool with the exception that you drag out an arbitrary shape instead of a rectangle, and whatever is inside that shape is selected.



## Selection Brush

allows you to paint a selection with a brush stroke. It has the basic parameters that you would expect to see in a brush like **Size**, **Strength**, etc.



### Size

varies the size of the brush from 0.1% to 100%, relative to the viewport dimensions.

### Strength

varies the intensity, where 100% means full strength. Please note that the selection strength is also varied by the variable intensity in the brush shape ( can have soft edges ), the pressure from your drawing tablet, etc.

### Hardness

Determines how hard ( or soft ) the edges of the brush shape are. When hardness is set to 100%, the previously soft edges become completely hard ( fully selected ).

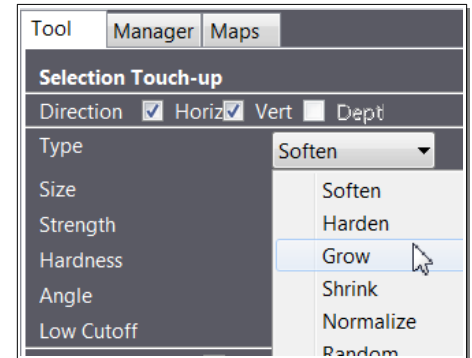
### Angle

Rotate the brush shape to any angle between 0 and 360 degrees.

## Selection Touch-up

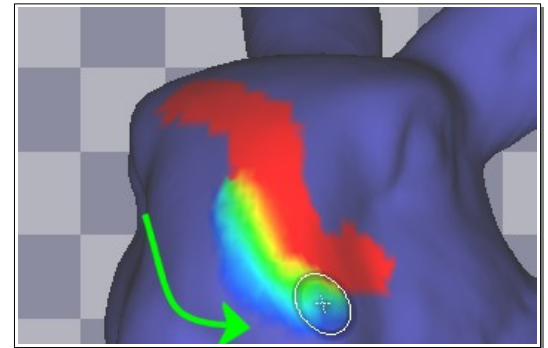


provides several types for modifying the exiting selection like **Soften**, **Harden**, **Grow**, **Shrink**, etc. Most of the types will simply modify the current selection, and will hence do nothing on an empty selection.

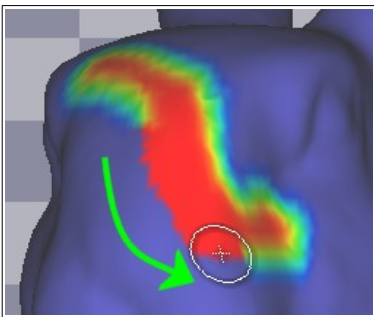


### *Soften*

As the name implies, will soften the transition between fully selected surfaces and unselected surfaces. This is similar to using the **Soften Selection** feature ( **S** hotkey ) except you can use it to soften specific parts of a selection, rather than the whole thing.



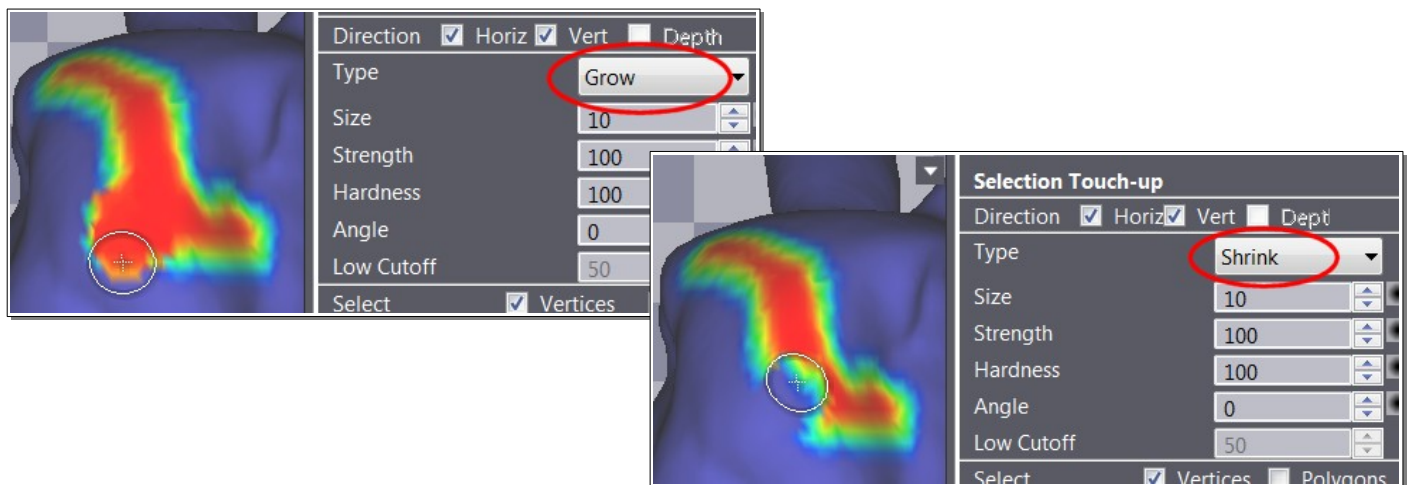
### *Harden*



The opposite of soften, it will force the selection to become either fully selected, or not at all, similar to the **Harden Selection** feature ( **N** hotkey ).

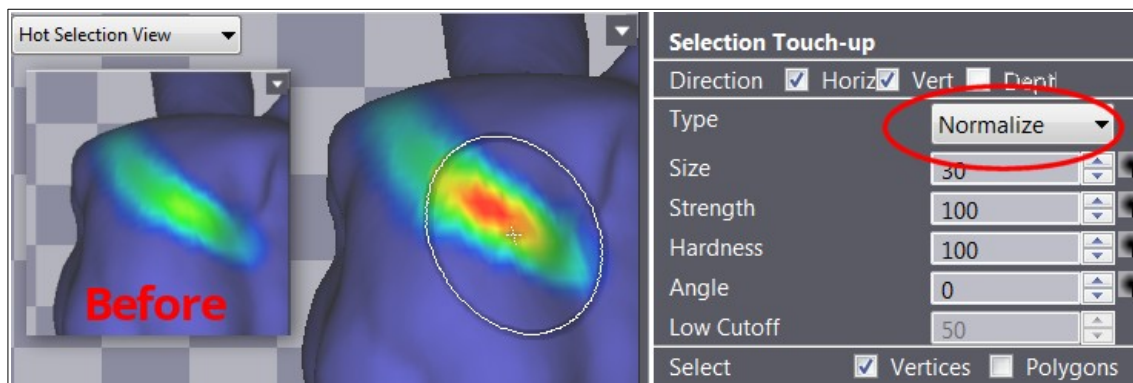
## Grow and Shrink

Causes the current selection to either grow or shrink according to the brush stroke. Notice how the relative softness of the selection is preserved as the selection expands or contracts. **These modes are very sensitive and best used with single clicks**, rather than click and dragging. Otherwise, the hardness may build up too fast.



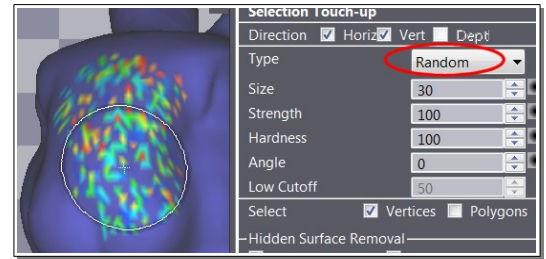
## Normalize

Takes a weaker selection, and rescales the value so the strongest becomes fully selected, ( 100%, or red ).

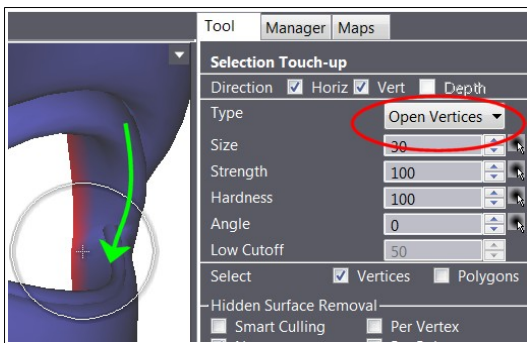


## Random

Selects vertices randomly, which may be useful for creating bumpy deformations, or uneven paint distributions.



## Open Vertices

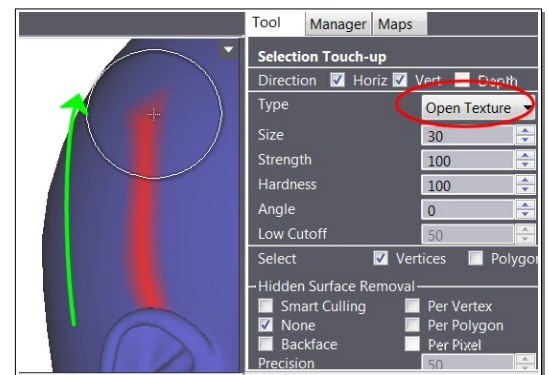


surface around them.

Selects vertices that are on an open edge ( in XYZ space ). This can be very useful for special applications, such as locking open edges ( to prevent deformations ), or to isolate and fix bad deformations along the open vertices. You may choose to also **Grow Selection** ( See Menu-Edit-Select...-Grow ) after selecting the open vertices to select more of the

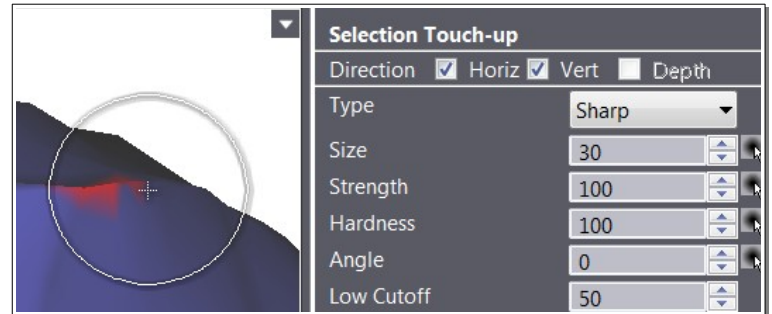
## Open Texture Seams

Identical to **Open Vertices**, except it operates in UV space, selecting the UV seams. It is used for special applications, perhaps to select and blur the paint around a texture seam.



## Sharp

Selects vertices based on how sharp the surface is, in an absolute sense. Please see **Artifacts** to select vertices that have become sharp as a result of deformations.

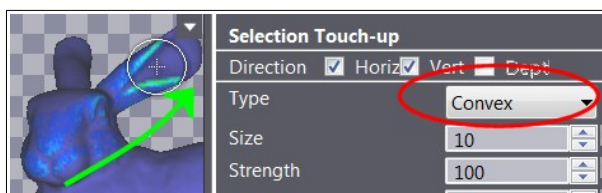


## Concave

Selects the surface based on the amount it is concaved, that is, dented inwards. You can visualize the concave surface by using the **Concave Shading** display mode to get a better idea as to what this means.



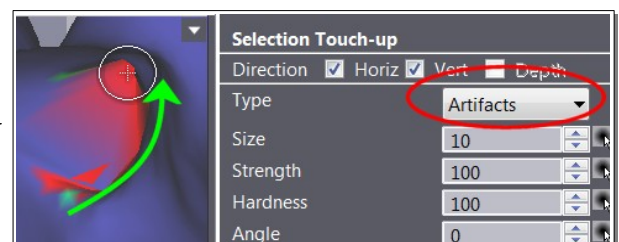
## Convex



The opposite of **Concave**, it selects the surface based on the amount that it's convex, that is, bulging out.

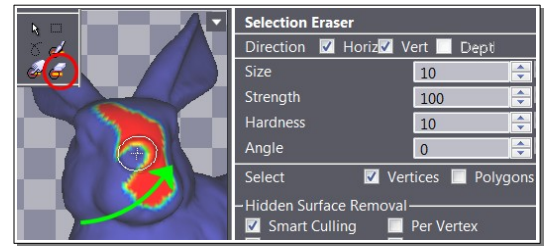
## Artifacts

This is a very specialized selection tool for selecting vertices that have become very sharp as a result of the current deformations. It is very useful for fixing bad geometry that has resulted from said deformations, so it can be smoothed out or fixed in some other way.



## Selection Eraser

allows you to erase segments of the current selection, and is equivalent to using the **Selection Brush** with the **ALT** key held.



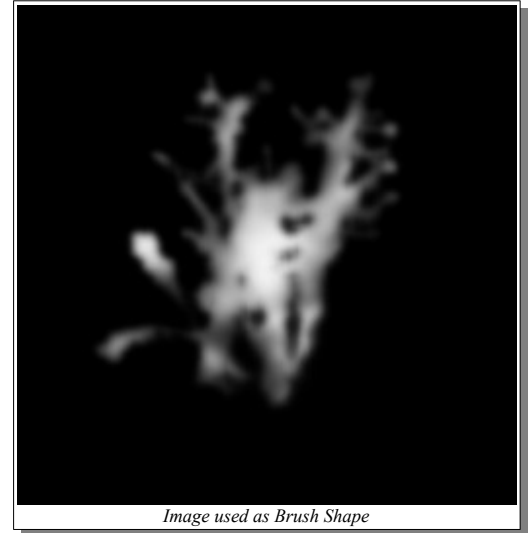


## Paint Brushes

### Paint Brush



You should become most familiar with this brush as it is the most important feature in the software. A single brush stroke can apply a simple color, or a complex texture if a **Brush Image** is applied. You can paint the whole object in single stroke, or you can zoom in and fill in individual pixels.



*Image used as Brush Shape*

The shape of the paint brush can be changed by choosing one from the **Brush Shape** box at the bottom left corner of the window. If you would like to use a brush shape that is not included, you can drag and drop any supported graphic file into that box, and the shape will be defined by the **lightness** of the pixels within the image. So, typically, a greyscale image that is surrounded in black, with a white center and grey in between works best.

Next, talk about **Brush Images**. We deliberately don't call them "Brush Textures" to avoid confusion with the textures that you are actually painting. A **Brush Image** is a texture for your brush. When used with the basic **Paint Brush**, it transfers the color from the brush stroke to the destination textures. For other tools, such as the **Light Adjustment Brush**, the intensity (lightness) of the texture determines the strength of the effect.

By default, **Brush Images** are mapped to the space of the viewport. So imagine the texture stretched across the viewport (adjusting for the image aspect ratio of course) and that is how the texture will appear as a result of the brush stroke. In fact, you do not have to imagine it, since you can press the **V** hotkey to view the current **Brush Image** tiled across the object. There are more advanced methods of wrapping the **Brush Image** onto your model, which you can read about in the **Brush Tile Setup** section.



## Clone Brush

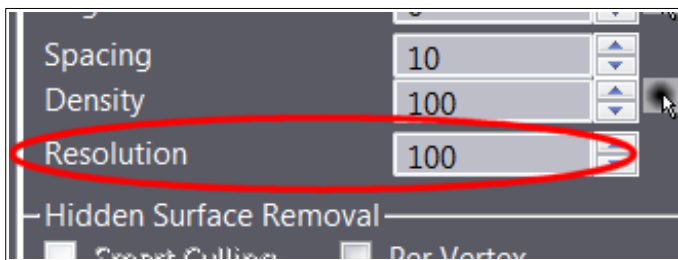


The Clone Brush is an extremely powerful tool which should be familiar to you if you are experienced using 2D painting applications. It allows you to dynamically copy portions of any textures visible in the viewport to another location. To use it, simply hold the **ALT** key and click on the reference point. Then start painting on another portion of the object(s) and see how the texture is copied.



*Cloning textures on the object in the viewport*

## Resolution



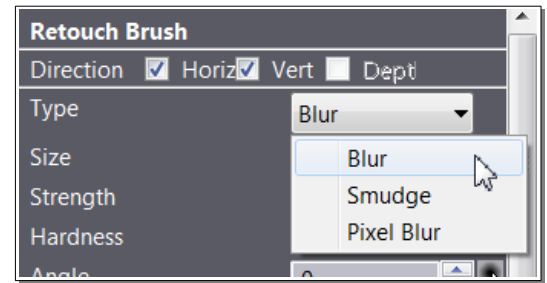
Increasing this parameter beyond 100% yields higher resolution results. The **Clone Brush** uses the contents of the **viewport as the brush image**, so the size of the viewport affects the resolution of the results, no matter how high the resolution

of the destination texture maps. So, by increasing the **Resolution** parameter, Blacksmith3D will re-render the viewport in the background at a higher resolution and use that the result to create a higher resolution clone effect.

## Retouch Brush



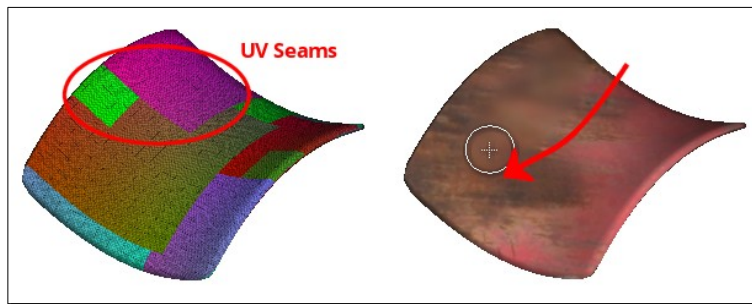
The Retouch brush contains three types – **Blur**, **Smudge** and **Pixel Blur**.



### Blur

smooths the pixels on the destination texture map.

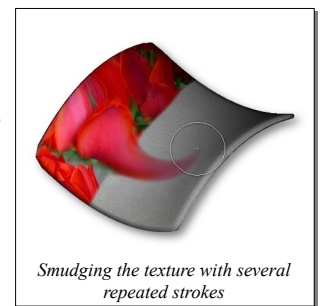
The unique thing about this tool is that it blurs the pixels in the space of the viewport, and not of the actual texture map. This enables you to **blur across UV seams** or across different **Image Maps**. To perform a traditional blurring directly in the texture map space, use the **Pixel Blur** type instead.



### Smudge

is similar to blur, except that blurred pixels follow the path of the brush stroke, making it very useful for “pushing” pixels from one place to the next. Like **Blur**, smudging is done in the space of the viewport, so smudging across UV seams is a non-issue. Unlike **Blur**, there is no direct pixel equivalent.

**Important Note** – The smudge brush works best when the **Spacing** parameter is set to a low value, preferably 1.



### Pixel Blur

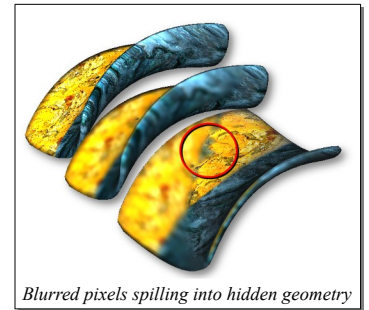
works directly on the texture map, and may be useful in special cases. It will however not work that well across UV seams, and may cause them to be **MORE** apparent, so only selectively use Pixel Blur where no UV seams exist. Unlike Blur and Smudge, pixel blur CAN blur hidden geometry without issues.

## Commentary

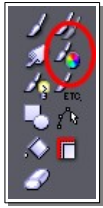
Blur and Smudge both depend directly on the current viewport size and orientation. i.e. they “use” the viewport to obtain their effects. That is why we can easily blur and smudge across UV seams. You can even blur or smudge from one texture map to the next as if they were the same.

The results you get will depend on the current size of the viewport, as loss of resolution may occur. However, since both of these types naturally cause blurriness, this should not be a significant issue. Just note that the farther you zoom out, the stronger the blurring effect will be.

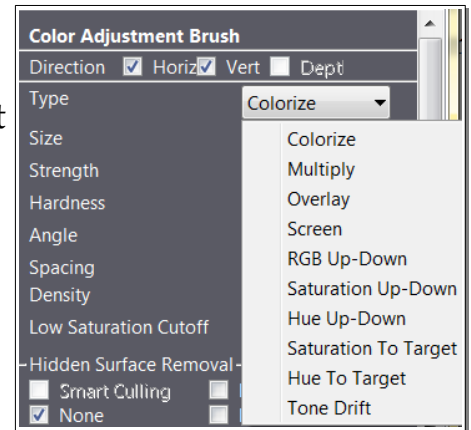
Also note that since Blur and Smudge depend on the state of the current viewport, you cannot blur or smudge hidden geometry, so **Hidden Surface Removal** is forced to be **Per Vertex** or greater. Also note that some spillover may occur into hidden geometry areas, so try to be careful on where and how you blur or smudge.



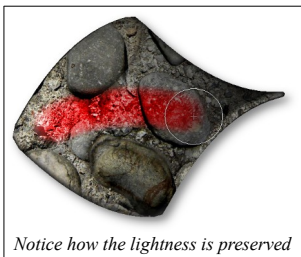
## Color Adjustment Brush



allows you to affect the color of your existing textures. You may be used to doing this sort of thing in a 2D application, but now you can adjust qualities such as hue and saturation on a 3D surface with a simple brush stroke.

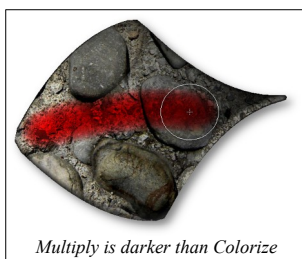


### Colorize



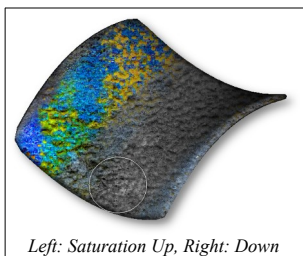
intelligently replaces the colors of the texture with that of the brush stroke. It works with simple colors and with **Brush Images** for more complex effects. Please note that this type utilizes the **Low Saturation Cutoff** parameter, so dark colors in the source image do not yield unexpected results.

### Multiply



is a simplistic version of Colorize, which multiplies the source and destination colors together. The results tend to be darker than **Colorize**, since qualities like “lightness” are not well preserved. For example, **multiplying** White with Red yields Red, while **Colorizing** white with red yields white.

### Saturation Up-Down



makes the colors in the destination texture “more colorful” with each brush stroke. To make the destination texture less colorful (Saturation Down), hold the ALT key while painting.



## Low Saturation Cutoff

provides a lower limit for unsaturated colors, so they do not saturate to seemingly random and unsightly colors. Please see the *It's in the Details* section below for more details.

## It's in the Details

Please note that there are special cases to consider, especially when there is little or no “color” in the texture to begin with. This can happen when the destination pixels are close to or equal to a greyscale value, black or white.

Blacksmith3D does it's best to compensate for this by introducing the **Low Saturation Cutoff** parameter. Colors that have little or no saturation will stay “greyish” instead of increasing their saturation to seemingly “random” colors. A value of 10% is typical for the **Low Saturation Cutoff**, and it should only be decreased if you want to get more color out of the low saturation areas, although, they may appear more “speckley” as a result.

## Hue Up-Down

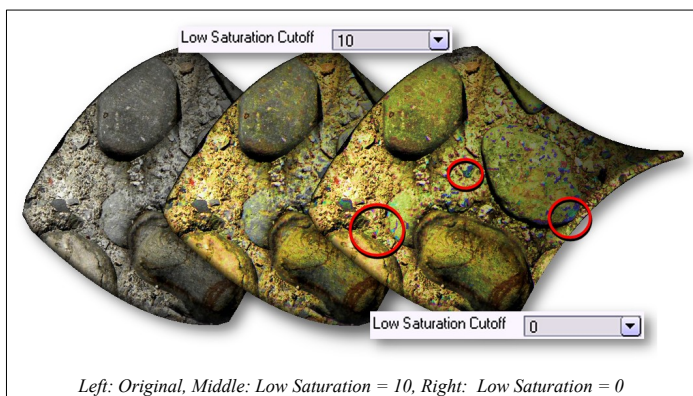


Left: Hue Up, Right: Hue Down

makes the hue of the destination pixel go up or down the color wheel. An increase of the hue can shift red towards yellow, yellow towards green, green towards cyan, cyan towards blue, blue towards purple and finally purple towards red. **It is highly recommended that you use a low value for “Strength”** when using this brush and apply multiple strokes to achieve the best

results.

## Saturation To Target



Left: Original, Middle: Low Saturation = 10, Right: Low Saturation = 0

sets the saturation of the destination texture to that of the source color (or brush image). This is similar to Saturation Up-Down, except the saturation of the source color “replaces” the saturation of the destination texture. Please note that like Saturation Up-Down, similar artifacts can occur in areas of

the destination texture that have little to no saturation to begin with, and the **Low Saturation Cutoff** parameter compensates for this.

### *Hue To Target*



sets the hue of the destination texture to that of the source color (or brush image), while maintaining it's saturation and lightness values. To simultaneously change the hue and saturation, use the **Colorize** type instead.

### *Commentary*

This brush can extremely powerful for creating subtle color variations in complex texture projects. For example, you can make a human face more realistic by adding a subtle amount of blue hue under the eyes, red on the cheeks and nose, etc. It is a best practice to keep the **brush strength low**, and slowly build up the desired effect, rather than trying to do too much with a single brush stroke.

Also, please note the *It's in the Details* notes, as we made our best attempt to compensate for special cases which would otherwise leave you frustrated with unexpected and unnatural results.

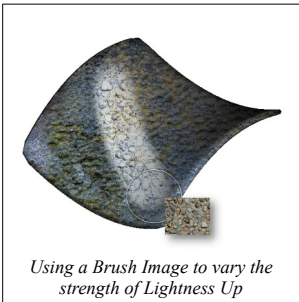
Lastly, you may expect the **Lightness Up-Down** and **Lightness to Target** types to appear in this brush, however, we decided to make a separate **Light Adjustment Brush** to house all blending types that are related to lighting instead.

## Light Adjustment Brush



contains the blending types that in some way act on the apparent lighting effects of the texture. It can be used with or without a brush image. When a brush image is used, the intensity (or greyscaled version) of the brush image is used to increase or decrease the effect of the brush. For example, using a bumpy **Brush Image** with **Lightness Up** will increase the lightness of some areas more than others.

### *Lightness Up-Down*



as you may expect, increases or decreases the lightness of the destination texture. The default behavior is to lighten, while holding the **ALT** key results in a darkening effect. Please note that the lightness/greyscale values of the **Brush Image** will be used to vary the strength of the effect, while the hue/saturation will have no effect.

### *Lightness to Target*

sets the lightness of the destination pixels to that of the source, while maintaining the color information of the original. Notice in the image below how the bluish color of the original is maintained while the details of the **Brush Image** have been transferred.



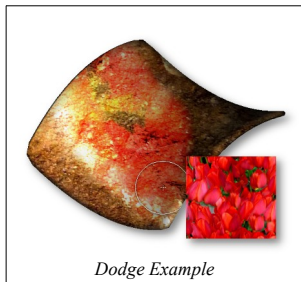
*Left: Original, Right: Lightness To Target*

## Dodge-Burn



Left Stroke: Dodge, Right: Burn

yields the classic Dodge and Burn effects that started in traditional photography and are now standard tools in the digital artist's repertoire. The default behavior is **Dodge**, and holding the **ALT** key yields **Burn**. It is a bit hard to explain in words, but Essentially **Dodge** combines the source and destination colors in such a way that the result is generally lighter. **Burn** combines them such that the result is generally darker. See image below illustrating dodge and burn, which is generally more interesting when using a **Brush Image**...



Dodge Example



Burn Example, hold ALT Key

## Contrast Up-Down

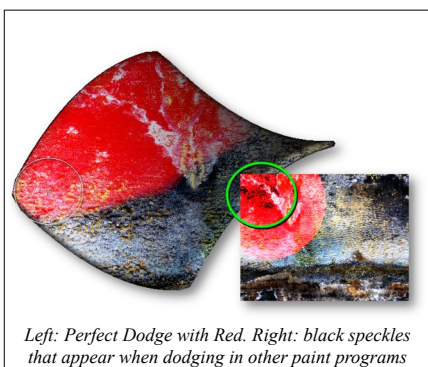


Left: Contrast Up, Right: Down

allows you to increase or decrease the contrast of the underlying image with the precision control of a paint brush. The default behavior of this brush is **Contrast Up**, and holding the **ALT** key yields **Contrast Down**.

Like most other blending types, the **Brush Image** affects the level of contrast.

## It's in the Details



Left: Perfect Dodge with Red. Right: black speckles that appear when dodging in other paint programs

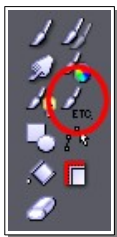
Many painting applications use a little mathematical trick to speed up the performance of **Dodge** and **Burn**, but yield unsightly colors in some special cases. We at Blacksmith3D decided that we'd make our optimizations elsewhere, and make the behavior of **Dodge** and **Burn** more consistent and natural. As you can see in this image, black speckles can appear in other programs when dodging pure red over

pure black, inconsistent with their surroundings.

### Commentary

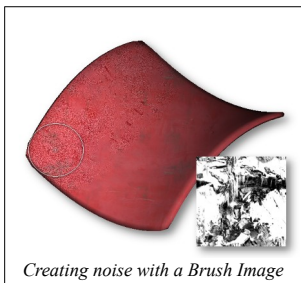
All of the blending types in the **Light Adjustment Brush** utilize the **Brush Image** to help create complex effects. Most use the **lightness** of the pixels in the **Brush Image** to vary the strength of the effect, i.e. **white** yields the maximum strength while **black** yields the least. **Dodge** and **Burn** use the color information to achieve their effects, so dodging a reddish **Brush Image** yields a different effect than a **blueish** one.

### Touch-up Etc. Brush



This brush contains a variety of blending types that did not logically fall into the other categories, and currently do not have enough similar types to be grouped with. We therefore lumped them into one brush. Therefore, this may be considered the **Everything Else** brush.

### Noise

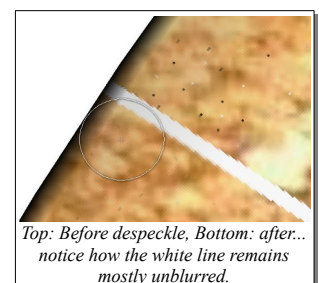


simply introduces random noise to the texture, which if used correctly, can add a realistic gritty feeling. Too much noise can make it look simply random, so use with care.

Please also note that the **Brush Image** can be used to create uneven noise distributions as illustrated in the accompanying image.

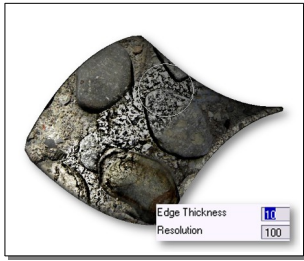
### Despeckle

is similar to the **Pixel Blur** blending type found in the **Retouch** brush, except that it mostly blurs pixels that greatly differ from it's surroundings. It will indeed have a subtle blurring effect on everything, but mostly on the isolated speckles. So, if you simply need to make your texture a **bit less grainy** and **not too blurry**, this is the tool for you.





## Edge Enhance



emphasizes and sharpens details in textures, yielding a grainier yet sharper look. It is also capable of enhancing edges across UV seams consistently, since it operates in the viewport space to determine what edges to enhance. Like other similar blending type, it utilizes the **Resolution** parameter to help prevent resolution loss. It also features an **Edge Thickness** parameter which allows it to enhance thicker edges and reduces the grain.

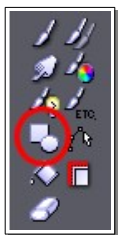
## Emboss



is similar to **Edge Enhance**, except the result is a greyscale representation of the edges only. So, if the destination texture is relatively smooth, then the result is mostly grey. If the texture has lots of edges and/or speckley detail, then they will appear as light or dark edges. Also note that the **Edge Thickness** and **Resolution** parameters are available as well, and behave exactly as they do for **Edge Enhance**.

Again, let us emphasize that you can use this blending type across UV seams, and the pixels on one side of the seam will “know” of the pixels on the other, so the seam will not disrupt the cool emboss effect.

## Shape Brush

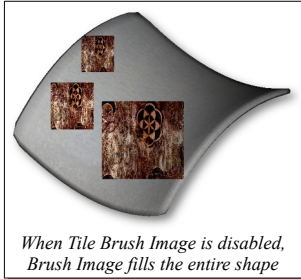


allows you to paint geometric shapes such as **Rectangle**, **Ellipse**, and **Polygon**. The shapes are rigid by default, and by enabling the **Use Brush Shape** option, the brush shape will be used to “stencil” the result. The **Create From Center** option results in the shape being centered on the initial point from which you clicked.

For more advanced shape and line drawing, it is recommended that you use the projection brush ( see Using the Projection Brush ), and do the shapes and lines in your favorite 2D painting application.



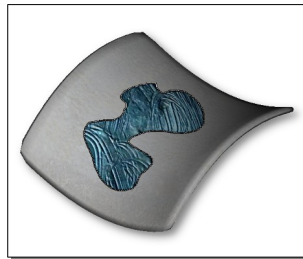
## Rectangle & Ellipse



creates a shape by clicking and dragging out a box in the viewport. Please note the above comments about **Create From Centre** and **Use Brush Shape**, and the **It's in the Details** section below.

## Polygon

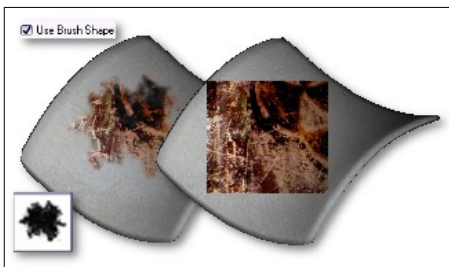
Allows you to create an arbitrary shape in the viewport by connecting multiple points together. When the **Freehand** option



is enabled, then you can simply draw a shape in the viewport and it will be applied to the texture(s) when you complete the stroke. If **Freehand** is disabled, then you can click in the viewport to define each point of the shape, and then press the **Enter** key to apply it to the texture(s). Please note that the **Use Brush Shape** option is also available for the **Polygon** type, however, you may not get the results that you may expect, as the **Brush Shape** will not warp to the shape of the drawn polygon.

## It's in the Details

A very important point to note is that the **Tile Brush Image** option (found by clicking

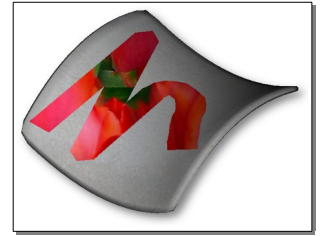


on the **Brush Image Box**) affects how the brush image is used with the **Shape Brush**. When tiling is enabled, then the **Brush Image** is wrapped according to how the tiling is currently setup. When **Tile Brush Image** is disabled, the **Brush Image** fills the entire shape.

## Line



This tool allows you to draw a line, or series of connected lines. This is a very simple tool, but those of you who are used to painting textures in a 2D application know how difficult it can be to get a straight line across a warped UV mapping. As long as the UV



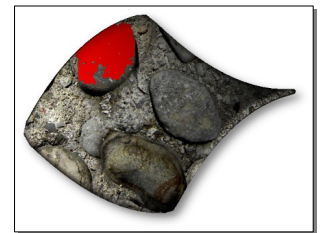
mapping isn't too bad, the line you draw will be as straight as can be. There are two options to be aware of - **Close Path** will draw a line between the first point and the last point, creating a closed loop. The **Freehand** option allows you to freely sketch a line instead of clicking from point to point. Lastly, note that the **Brush Image** will indeed be utilized if one is loaded.

**For more advanced shape and line drawing, it is recommended that you use the projection brush, and do the shapes and lines in your favorite 2D painting application.**

## Flood Fill



is a familiar tool to any graphic artist, as old as the very first digital paint programs. Here, it behaves mostly the same as you might expect. Like many of the other brushes, it operates in the space of the **Viewport**, and not that of the actual texture maps. So what that means



to you is that you can flood fill across UV seams, and even flood fill from one map to another. The fill is controlled by the **Tolerance** parameter. Higher values allow the color to flow into neighboring pixels more easily, while lower values restrict the flood to similar colors only. To use a more advanced flood fill, please use see the tutorial Using the Projection Brush and use your favorite 2D painting application.

## Bleed UV Seams



is an indispensable tool for correcting textures that were painted in other applications, and for preparing textures to be used for **MIP Mapping** or other filtering methods that require the color to spill well beyond the UV seam. When using this tool as a brush, you can simply paint over the areas that you would like to have the UV seams bled. Since most of the effect takes place on the map where you cannot see it, you may not notice anything happen except for a subtle change in the texture filtering at the seam. If you would like to bleed one or more whole maps, then highlight them in the manager, then click on **Bleed Highlighted Maps**.

### *Inner Radius*

represents the minimum distance from the seam (in pixels) before the bleed begins. The main purpose of this parameter is to protect the fine job that Blacksmith3D did painting beyond the seam, which yields a dramatically less noticeable seam. You should only set this to 0 in special cases, or if the texture was created in another program and your are simply fixing it up.



### *Outer Radius*

represents the maximum distance from the seam that the bleed should extend. The larger this value, the longer it will take for the bleed to occur, so be wary of using very large numbers here. The default value is 16 pixels, which should be sufficient for most cases. Also, please note that the bleed will never interfere with other portions of the UV map, so if it runs into another chunk of polygons, it will not bleed over them (This is assuming that your model has good UV mapping).

## Bleed RGB Channels / Alpha Mask

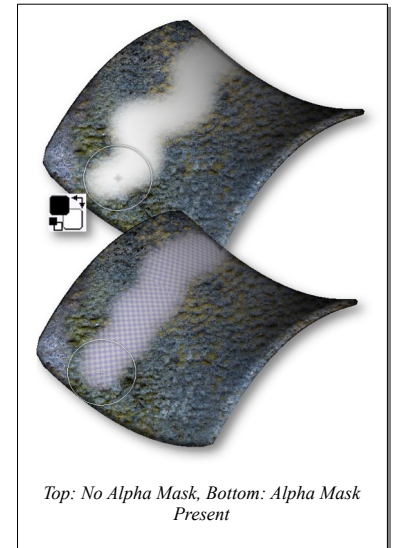
allows to control what is bled. There may be special cases where you want to bleed the color, but not the alpha mask, or visa versa. In any case, keep both of these options checked unless you have a very compelling reason for unchecking them.

## Paint Eraser

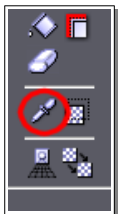


does as you expect, it erases previously drawn pixels. You may not expect what it replaces the previous pixels with. There are two scenarios to consider - the presence of an **Alpha Mask**, and the absence of one. When an **Alpha Mask** is present, then erasing clears the pixels, exposing the checkered grid to represent the **transparent** areas. An **Alpha Mask** is only present when yuo have created at least one **Image Map Layer**.

When no alpha mask is present, the pixels will simply be replaced with the **Secondary Color**.



## Color Picker



default.

allows you to grab a color from the viewport and assign it to the **Primary** or **Secondary Colors**. Hold the **ALT** key to grab the latter. There is one option and that is **Pick Unlit Colors**, which grabs the color before any lighting is applied for consistency, and it is checked by



## Texture Picker



lets you grab a texture straight from the viewport, and loads it as a **Brush Image**. The **Feather** option smooths out the edges of the texture, and it is represented as a percentage of the sampled texture size, and not in pixels as you may expect. There is also a **Freehand** option which allows you to draw an arbitrary shape around the texture sample that you would like to grab. Like the **Color Picker**, there is a **Pick Unlit Colors** which is checked by default, as it usually doesn't make sense to include the light shading in the sampled texture, except for special cases.



## Projection Brush



is a remarkably simple, yet extremely powerful tool which allows Blacksmith3D to be as powerful as any 2D painting applications that you may possess. It allows you to take a snapshot of the current viewport, load it into a 2D paint application, paint whatever you wish, then bring the results back into Blacksmith3D.

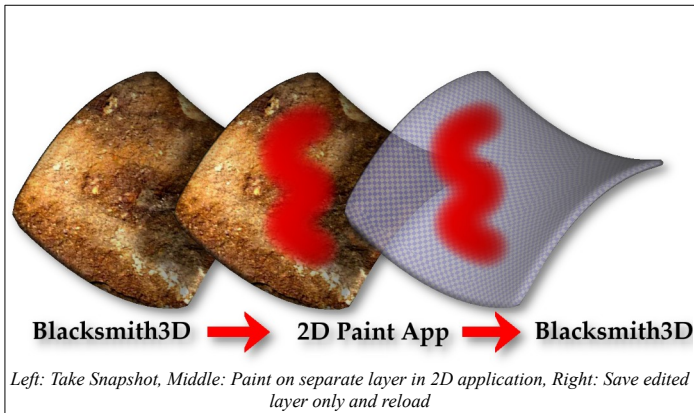
## Resolution

increasing this parameter beyond 100% allows you to export a higher resolution snapshot of the viewport, **which reduces the possibility of resolution loss** when transferring to and from the 2D paint application of your choice.

## Take Snapshot

exports the contents of the current viewport to a file that can be quickly dropped into a 2D paint application for further editing. After clicking this button you will be prompted to save a **PNG** file. A corresponding **.info** file will be created along side of it containing the viewport information in case you change the viewport (e.g. Rotate, Zoom, etc.)

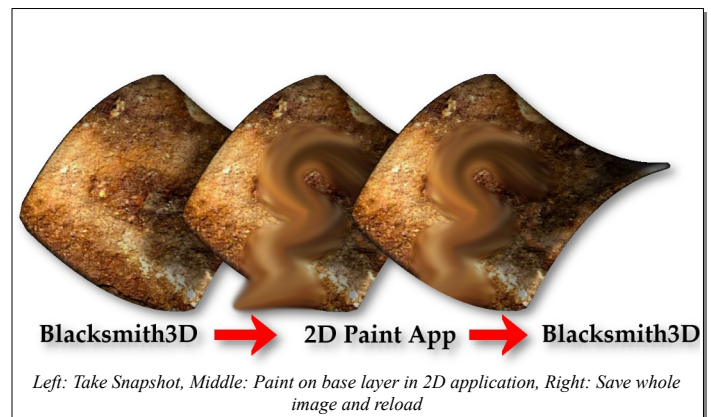




You can utilize any number of techniques for making the edits. If you are simply painting features on top of the current textures, then we recommend that you create another layer in the 2D paint application, paint on it, and then **hide the base layer before re-saving the snapshot file**. In that way, only the **new details that you painted will be present**, which will

help guard against resolution loss.

If you plan on smudging, blurring or otherwise manipulating the textures that are already present, then you will want to edit the base layer, or save the file with all layers visible.



### *Reload Snapshot*

imports the edited image file as a brush image, restores the viewport to it's original orientation (in case you rotated, zoomed or otherwise changed the view) and makes everything ready to go. We stopped one step short of actually applying the updated texture here since there will be many special cases in which you will want to selectively apply the paint. So, with that being said, simply paint the changes directly in the viewport, so you can be sure to avoid areas with a sharp drop-off that will cause the projected texture to “stretch” across the sides.

### *It's in the Details*

After reloading the snapshot, you can paint the changes back onto the model as



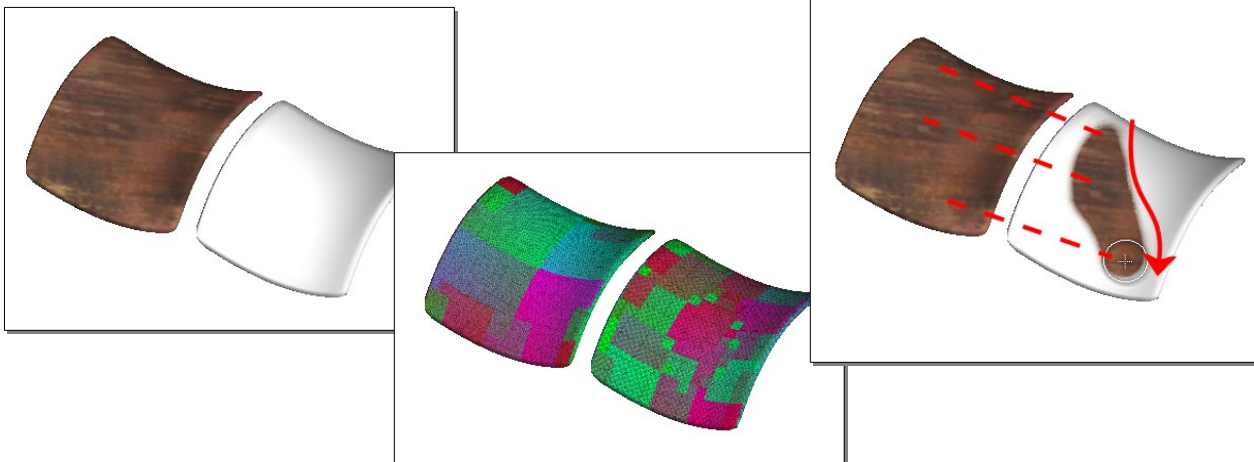
mentioned. However, you are also free to use another paint brush to apply the changes (e.g **Shape Brush**) or any brush that utilizes the **Brush Image**, since that's all it is - the viewport snapshot that is now reloaded as a brush image, framed to fit the viewport perfectly. (p.s. Do not resize the window during this process. It may cause the snapshot and the viewport to become out of sync.)

## Texture Transfer Brush

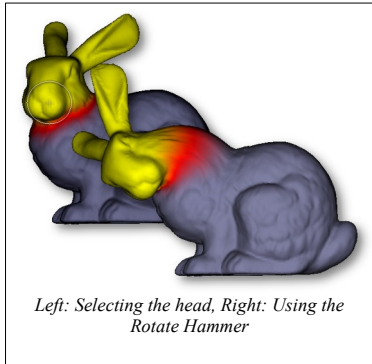


is a specialized tool which takes two **identical** objects ( polygon, vertices ) with **different UVs** ( and hence image maps ), and transfers the textures from one to the other via brush strokes.

To use it, simply load both version of the object, and use the **Move Transform** to offset one from the other in the viewport. Make sure both of them have textures applied to the proper materials ( according to their own UV layouts ) and apply a brush stroke to one of them. When you are finished the stroke, the textures from the opposite object will appear where the brush stroke occurred.



## Morph Tools



Blacksmith3D has two main classes of deformation tools – **Hammers** and **Chisels**. Using the analogy of a blacksmith, hot selections and hammers allow you to "heat up" and "deform" objects in a very intuitive way. The hotter portions of the object deform the most and the cooler parts deform the least. In this way, you can easily create smooth and continuous morphs, with little effort.

With that being said, the selection tools, as discussed previously in this manual, are used to provide the **heat** while the hammers **bend** the object into shape. As such, creating a complex morph is simply a matter of repeating this two step process; **select and deform**. To use a hammer, you simply **click and drag in the viewport** to deform the model, and the results are generally proportional to the direction and amount that you drag.

On the other hand, **chisels** act more like brushes, where you can deform the model as you click and drag across the surface of the model. Chisels allow the artist to create eloquently sculpted shapes quickly and intuitively.

## Workflow Note

When it comes to interacting with selections, chisels behave more like paint brushes given the following rules:

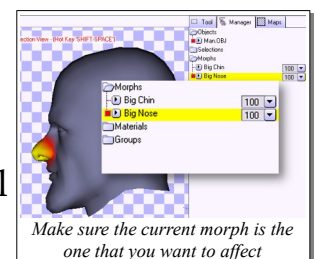
- If there is no selection, then the chisel can affect anything (that isn't locked or hidden)
- If there is a selection, then the chisel can only act on the selected areas.
- The strength of the deformation will be proportional to the selection value, so a weaker selection value will result in a weaker deformation.

Hammers, on the other hand have a slightly different workflow. They only act on the selected surface, and if there is no selection, then nothing happens. To deform the whole object uniformly, you must select the entire surface by selecting the menu option **Edit->Selection->Select All** (or CTRL-A), or by using the **Picker Tool**. Please note that if you are working with multiple objects, and you wish to move, scale or rotate an object merely to organize your workspace, then please use the **Transform** tools, which allow you to do this logically in the workspace without actually deforming it.

When using hammers, if you only remember one hotkey when creating morph targets, then that key should be **S**. Hitting the **S** hotkey **softens** the selection, that is, it makes the gradient between the mostly selected (yellow) and not selected at all (grey) smoother, resulting in a more organic deformation. Keep hitting that **S** key until the selection is soft enough. Speaking of hotkeys, do not forget that the **SHIFT-SPACE** hotkey toggles the **Hot Selection View** mode, so you can see the selection colors consistently, instead of just while selecting.

Another thing to consider before describing the deformation tools, is when the morph tab is active, then the deformations act on the **current morph target**, which can be specified in the **Manager**. Also note, if the strength of the current morph target is something other than 100%, you can still edit the morph. However, take care as it may not look right when the value is reset to 100%.

On a similar note, you can have multiple morph targets active, and you may loose track of what shape deformations belong to what morphs. For example, you may be trying to **unmorph** a detail from the nose of a character and nothing may be happening. This

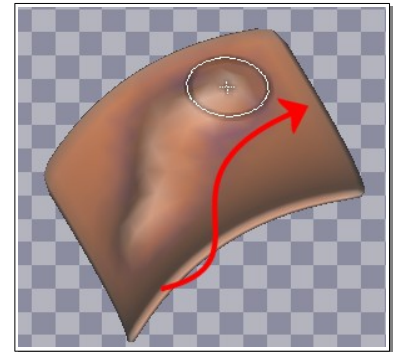


is most likely due to the fact that the current morph target does not contain the deformations that you are trying to unmorph. So, if you are working with multiple morph targets, be sure to cross your I's and dot your T's :D

## Bulge Chisel



This chisel is a fundamental tool for sculpting shape into your objects. The default behavior is for the surface to bulge outward, however, if you hold the **ALT** key while using it, the surface will dent inwards. Like most chisels, this one works best when the strength is reduced (say 20%) and the effect is slowly built up with multiple strokes. Also, the **Post Smooth** parameter is especially useful when creating smooth shapes, before beginning any fine detail work.



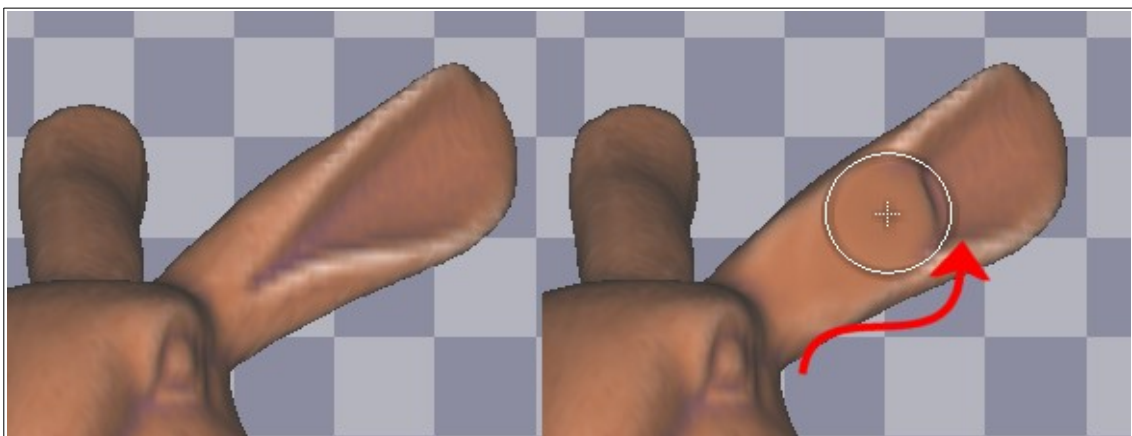
### Type

Determines the general shape of the bulge. Includes Normal, Mushroom, Spike and Round shapes.

## Resurface Chisel



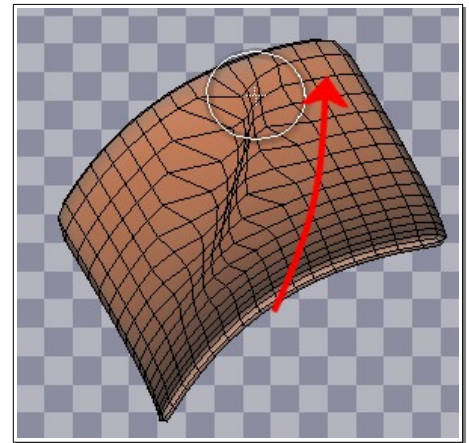
The resurface chisel combines both a bulging effect with a flattening effect. It allows you to **fill holes** in the surface as if you were filling them with clay and flattening it out. The amount of outward bulge can be controlled with the **Build Up** parameter.



## Contour Chisel



With this tool, you can simply draw a shape on the surface of the model, and the geometry will conform to it, allowing you to create detail where it was previously not possible. Be careful when using this tool with **Post Smooth**, as the post smoothing can destroy the curves as you create them. You will of course have to experiment with values of post smooth to achieve the effect that you want, but typically a value of 10% may be good enough to keep the geometry tidy, while still yielding the desired contours. You can of course keep post smooth at 0% and manually smooth out any kinks in the geometry later.

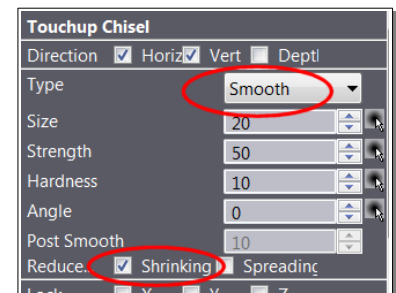


## Touch-up Chisel



Like all of the other **Touch-up** tools in Blacksmith3D, this one contains several **Types** to achieve a variety of effects.

The **Smooth** type allows you to select smooth portions of the object, simply by rubbing this tool over the surface. Unlike **Post Smooth**, this tool offers a few options as to how the smoothing takes place. If the **Reduce Shrinking** option is enabled, the smoothing will occur in such a way to discourage the surface from shrinking inward. Likewise, if the **Reduce Spreading** option is enabled, the smoothing will occur in such a way to discourage spreading on the surface. These two options are mutually exclusive, since they would cancel each other out if both were allowed to be checked at the same time.



The **Smudge** type, allows you to push surface detail around on the object. When the brush is small, and you move it fast, the effect is very similar to smudging 2D pixels. Using more controlled motions, perhaps with a larger brush size, you can move whole portions of the surface, without smudging the finer surface detail. In any case, this is an invaluable tool for shaping out a model by simply pushing the surface around.

The **Sharpen** type allows you to accentuate surface details simply by rubbing the

tool over them. In many ways, it may be considered the **Anti-Smooth**. As such, it's effects and not always desirable, and you should use it selectively, and be prepared to do further touch-ups after the fact. On a lighter note, it can be used to create stylistic results, especially for character development. Sharpening details like noses, cheek bones and eye brows yields a very edgy, unrealistic effect. Again, as with other chisels, this one works best using a lower value for strength, and slowly building up the effect with multiple strokes.

The **Flatten** type flattens the surface to a plane, based on the surface where you initially click on. As you flatten across a smoothed surface, it may be helpful to do a series of short strokes, to achieve several regions of relative flatness, or one big stroke to flatten everything to the same plane. Flattening a surface is often better than **Smoothing** when bunched up geometry occurs, and even better when mixed with a bit of **Post Smoothing**.

The **Unmorph** type selectively undoes the deformations in the current morph target. You can use this tool as an **eraser**, to undo some of your deformations, or you can use it to selectively **rip** portions of a morph target. For example, if you have a morph target for your character that changes the shape of the whole head, and you only want the nose to be morphed, then you can unmorph everything around the nose. It is very important to note that this only works on the **Current Morph Target** (the one that has a red box beside it in the **Manager**). If you are trying to unmorph something and nothing is happening, make sure you have the correct morph target selected first.

## It's in the Details

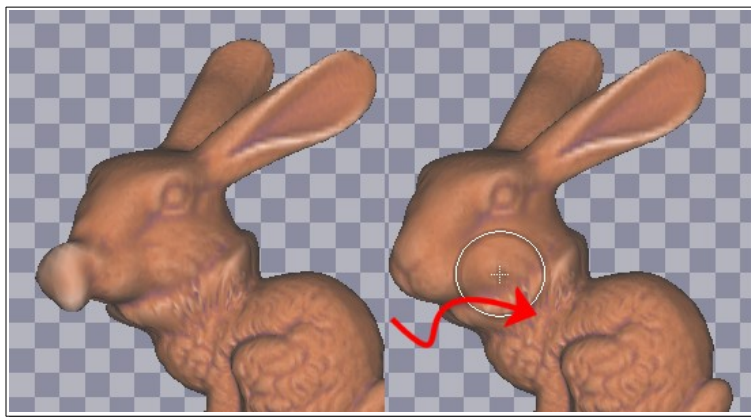
In order to make the chisel tools fast, efficient and intuitive, we created a new **Hidden Surface Removal** type called **Smart Culling**. It is recommended that you use this type most of the time while using chisels, unless you have really good reason not to. **Per Vertex** and **Per Polygon** culling types are not available while using chisels, since the topology of the model changes with each motion in the viewport, and recalculating these values with each iteration would result in poor performance.



## Unwarp Chisel



The Unwarp chisel helps to restore the original shape of the surface, while preserving the large scale changes such as scaling and positioning. It is very useful to clean up geometry that has become deformed in an unsightly way after multiple deformations. In the image below, notice how the warped nose is restored to its original shape, without losing the large scale morphing of the head itself. Simply **unmorphing** would have resulted in the nose shrinking to its original size.



The **Retain Flatness** parameter, when set to a non-zero value, helps to limit the unwarping in such a way that the local shape is better preserved. You may also think of it as **Retain Shape** on the larger scale.

## Transmorph Chisel



The Transmorph Chisel is an extremely powerful tool, and somewhat advanced, so understanding how it works is of vital importance. You may need to experiment with some simple cases before fully getting used to it.

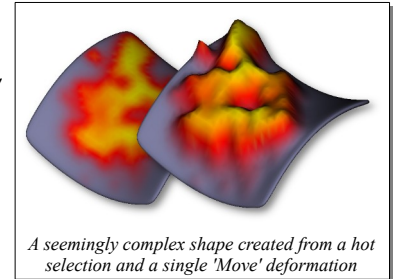
Essentially, it allows you sample a selected surface by clicking the **Setup Reference** button, then using the chisel on another object ( which is overlapping the original surface ) to morph it into that shape.

It is very important to note that if the two objects are not already close to each other, the resulting morph may be very rough. For this reason, there are **Post Smooth** and **Post Unwarp** parameters which help to clean up the surface after the each transmorph iteration. As the destination shape becomes very close to the original sampled surface, you may reduce these values to get a sharper result.

## Move Hammer



This simple deformer allows you to move the selected surface in the **horizontal** and **vertical** directions by default, and in the **depth** direction via the **Direction** control options. It is harder to visualize what is happening in the depth direction, so it is often preferable to view the object from the side, and deform the selection horizontally or vertically instead. You may think that simply moving the selection in this way would lead to boring, flat and un-organic deformations. However, doing a simple move with a hot selection can create curvy, organic effects.



## Rotate Hammer



Unlike the Move Hammer, the default direction for the Rotate Hammer is **Tilt** (depth). That is because it is the most common and most intuitive style of rotating, since it takes place in the 2D viewport plane. The center of rotation is determined by the initial point in the viewport that you clicked on. If you have trouble getting the center of rotation exactly where you want it, you can always follow it up using the Move Hammer.

The **Calculate Depth By...** parameter allows you to control the depth component of the center of rotation when the direction is set to **Horizontal** and/or **Vertical**, and it is not relevant when the direction is set to **Tilt**. You can choose from **Center**, **Surface**, **Closest**, **Farthest** and **Variable**.

Also note that in the **Control** box, the **Snap to Closest Vertex** is available, and will force the center of rotation to be the closest vertex to the point on which you clicked.

One last note regarding the direction controls, as with most tools in Blacksmith3D, the directions are **relative to the viewport space**. So the horizontal axis is always **left/right**, the vertical axis is always **up/down**, and the tilt axis is **in/out** of the viewport plane.

## Scale Hammer



The scale hammer allows you to scale the selection in one, two or three dimensions, depending on the **Direction** controls. Also, like the rotate hammer, you can control the depth component of the center axis via the **Calculate Depth By...**, and if you do not get it just right, you can follow it up using the **Move Hammer**.

This effect may not seem very impressive when acting on a hard selection, but on a soft selection on a portion of the surface, it's a great way of organically scaling strategic portions of the model, while maintaining a smooth transition to the unscaled portion.

## Bulge-Dent Hammer



Can be an extremely powerful tool when used strategically, and can make your model look really cheesy if used indiscriminately. In short, it deforms each vertex in the direction of its normal vector (outward surface direction). Dragging the cursor up results in a bulge, while dragging it down results in a dent.

This tool works best on relatively smooth and continuous surfaces, however it can cause finer detailed portions to bunch up and appear unsightly, so again, use it sparingly and strategically.

## Geometric Hammer



This hammer allows you to take the selected surface and reshape it into a mathematical, geometric shape, such as a Sphere, Box, Cylinder, Plane and Paraboloid. You can control the shape's origin based on where you initially click in the viewport, and the direction of the shape via the direction controls. Further changes to the shape (size, position) can be made by following it up using the Move, Scale or Rotate hammers.

## Touch-up Hammer



This hammer has three types; **Smooth**, **Flatten**, and **Unmorph**. The **Smooth** type allows you to smooth the selected surface, and you can control the smoothing by dragging the cursor more in the viewport. You can further control how the smoothing occurs via the **Reduce Shrinking** and **Spreading** options which are explained in more detail in the **Touch-up Chisel** section of this manual.

The **Flatten** type will flatten the selected surface to a plane. After flattening, if you feel that the angle is not quite right, you can follow it up using the **Rotate Hammer**.

Finally, the **Unmorph** type allows you to selectively remove the deformations in the current morph target. Again, you can read about this in the **Touch-up Chisel** section as it will explain this tool's workings in more detail.

### *It's in the Details*

You may be asking yourself, why have these two classes of deformer, chisels and hammers? They are doing much of the same thing, so isn't it redundant. The answer is, yes and no. Much of it is redundant, however, they represent two different work flows. The hammers are great for doing large scale deformations, where you will spend some time creating a complex selection and deforming the whole thing in a macroscopic way (e.g. Rescaling a character's proportions, like arm length, head size, etc.). The chisels are great for sculpting out the fine detail, and getting all of those distinctive curves that will make your model truly unique.

There are times when you can use a chisel for large scale actions, and a hammer for small ones, of course. You are free to use them as you will. If you like you to do free-form sketching, then you will tend to use the chisels more. If you like to strategically select and deform the model precisely, then you may tend towards the hammers. Use them as you will to create weird and wonderful creations that you never thought possible!

## Hair Tools

The hair tools tab contain tools specifically for the creation and editing of hair objects. They are similar to the Morph tools, with some special modifications for the smooth and natural editing of 3D hair objects. Let it be noted that these tools have been designed to work with hair objects created inside Blacksmith3D, and **most** hair objects that have been created using a combination of a hair cap and rectangular, transparency mapped strips. So you can create your own hair, or style pre-made hair using the same user friendly workflow.

To learn how to setup a model for hair creation/editing, please see the Setting Up a Hair Model tutorial.

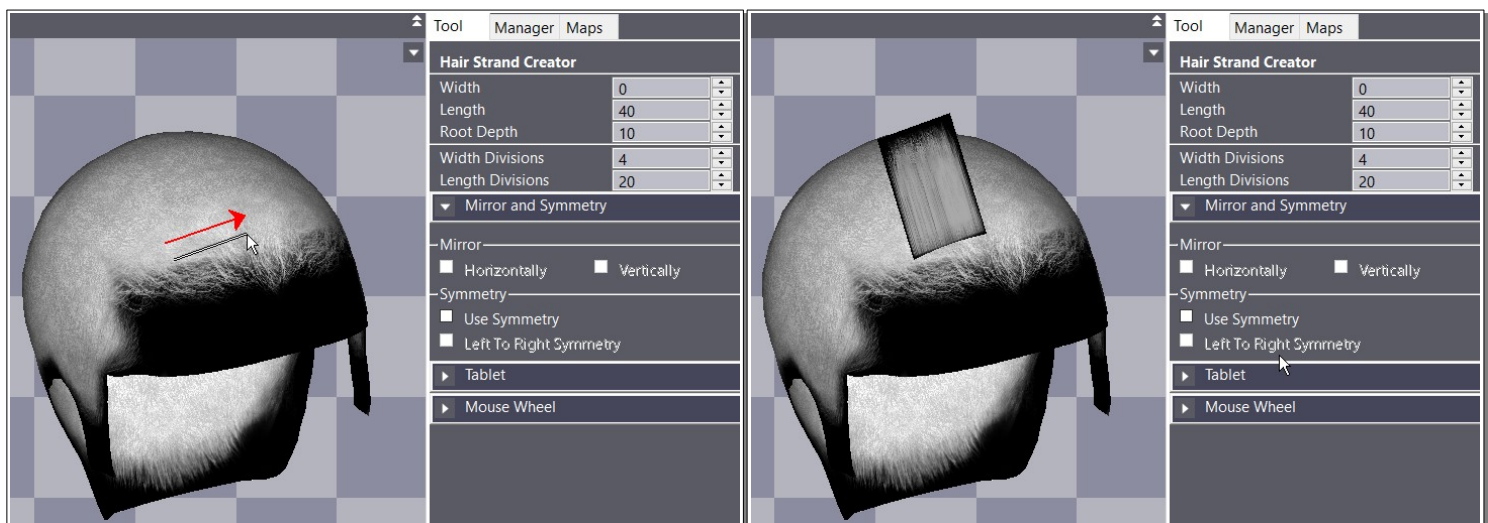
### Hair Strand Creator



The Hair Strand Creator is used for creating hair strands, usually derived from rectangular strips and placing them on the growth surface ( e.g. skull cap ). The hair effect is created using a combination of transparency and color maps, giving the illusion of each strand contain multiple hairs.

To create a hair strand, click ( and optionally drag to define direction ) on a material that has been flagged as a **Hair Growth Surface**. When the mouse button is released, a hair strand will be created at that location.

Workflows may vary, but it is typical to create a single strand, style it, and then copy and paste it repeatedly over a section of the growth surface.





### Length & Width

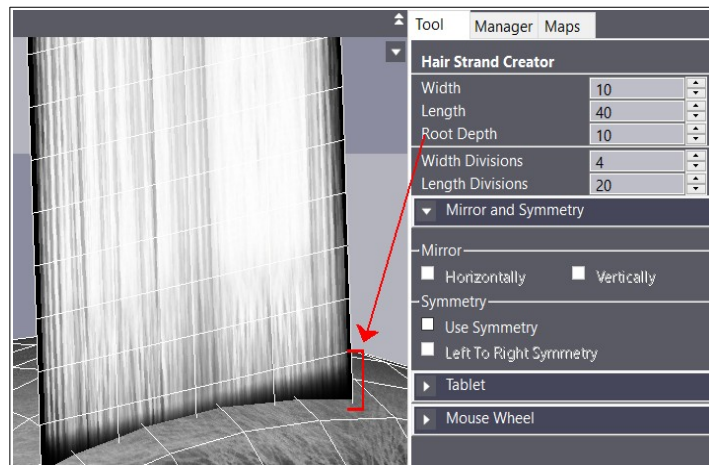
The **Length** and **Width** parameters determine the initial size of the hair strand. The length of the hair strand can be heavily modified when using the hair styling tools, however the width will tend to stay the same when being styled, so consider this when creating the initial strands.

The values for length and width are percentages of the size of the growth surface(s) on the target object. **Length** can be set to a value higher than 100%, while the **Width** value is capped at 100%.

The default value for **Width** is 0%, which means that the width is determined by the mouse dragging motion of the user. The wider they drag the mouse when creating, the wider the strand. However, a fixed value can be used here by entering a non-zero value for **Width**.

### Root Depth

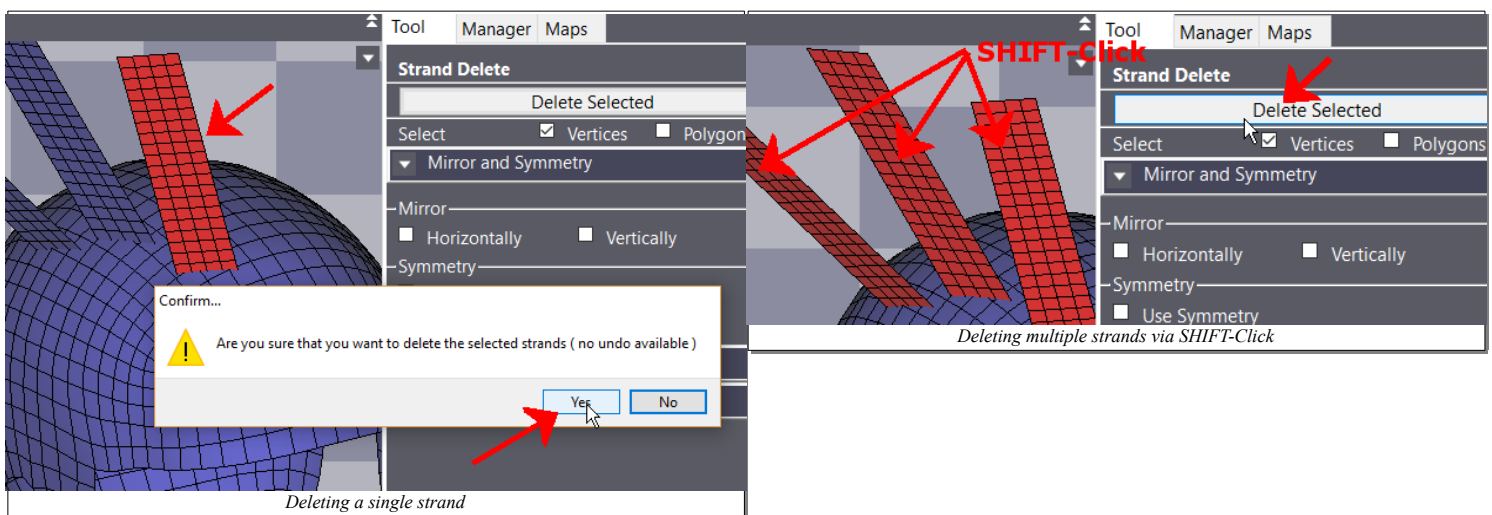
The **Root Depth** parameter determines how much the how far the hair strand will go beneath the hair growth surface, as a percentage of the row height. Please note that due to curved growth surfaces, the actual hair depth at any given point may vary.



## Strand Delete



The **Strand Delete** tool allows you to delete one or more strands from the hair model. To delete a single strand, simply click on it in the viewport. You will be asked to confirm that you indeed wish to delete the strand, and then it will be permanently removed from the object. To delete multiple strands, hold the SHIFT key while clicking on strands, and then click **Delete Selected**.



It is also important to note that you can use the conventional selection tools such as the **Picker** too to select whole materials, and then click **Delete Selected**.

## Strand Copy



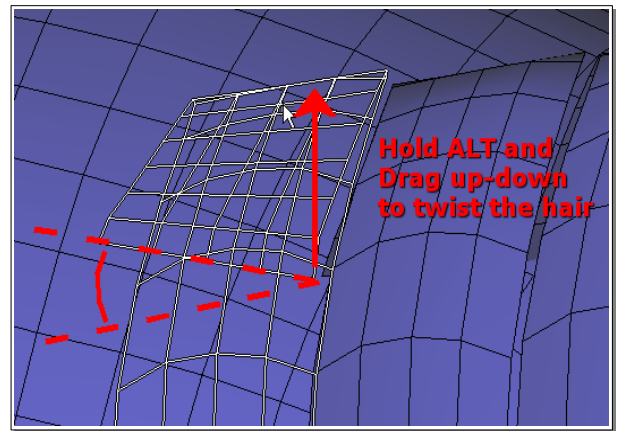
The **Strand Copy** tool allows you to copy one or more hair strands simply by clicking on them ( or SHIFT-clicking for multiple ). It is important to note that copying a hair strand will copy not only it's base geometry, but all of the Morphs, Display Groups, Materials, etc. associated with it. So, if you created separate morphs for "style" and "curls", etc. then the copied morph will also have those separate morphs.

## Strand Paste



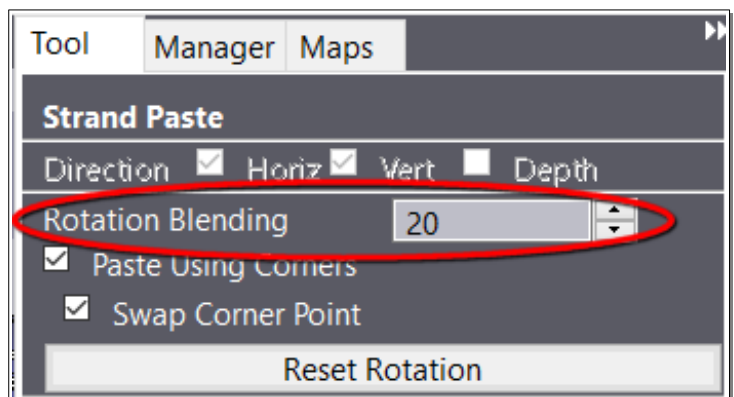
The **Strand Paste** allows you to paste the copied hair strands to another location on the growth surface. When clicking on the surface to paste, you can hold the ALT key while dragging the mouse left-right and/or up/down to rotate the hair to match the surface.

Holding ALT and dragging the mouse up-down will “twist” the hair around the normal vector point out of the growth surface. This allows you to carefully align the hair root with the visible hair line, etc. Dragging the mouse left-right, will “tilt” the hair so you can make sure that both sides of the hair strand touch the growth surface ( if desired). It may be difficult to visualize these rotations, so it may be helpful to use the **Four Viewports ( One Large )** viewport configuration so you can see the rotation from multiple angles.



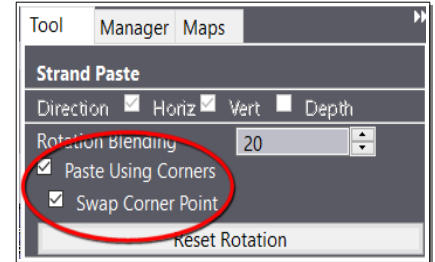
### Rotation Blending

This option allows to control how much of the hair strand rotates, and how much stays the same. For values less than 50%, the root area will smoothly rotate while the tip area will remain as it was before any rotation. At 50%, there will be a smooth rotation from root to tip, where only the tips keep their original orientations. At 100%, the whole strand rotates rigidly. The reason why this option is important is that we often want to keep the hair strands with the same orientation, but rotate the root areas to match the hairline.



## Paste Using Corners

The default behavior is to align the center of the hair strand with the mouse cursor. However, when tracing out a hair line, you may want to precisely match it with a neighboring strand, in which case, you'll want to use the **Paste Using Corners** option. If the corner being used is not the one you would like, then check the **Swap Corner Point** option.



## Reset Rotation

When pasting the same strand(s) multiple times, the rotation from the previous paste operation will carry over to the new one. You can reset the rotation back to zero by clicking on the **Reset Rotation** button.

## Strand Normal Flipper



When creating hair strands, the normal direction is “up” by default. However, if after styling the strand, it may make more sense to flip the direction of the surface normals, so that is what the **Strand Normal Flipper** does. Simply click on the strand you want to flip the normals for.

This is mainly for convenience, since in most cases you will want to render the hair materials as “double sided”, and you will want to have the **Draw Double Sided** option checked in Blacksmith3D. So, when editing inside Blacksmith3D, if **Draw Double Sided** is checked, then you will not notice any difference after using this tool. A few deformers like the **Strand Volumizer** and the **Bulge Hammer** and **Chisel** will behave differently ( since the normal direction has been flipped ), but most other tools will behave the same before and after the flipping.

## Strand Move



The **Strand Move** tool the core hair styling tool that allows you to select individual or multiple hair strands ( SHIFT-Left Click ) and move them in the viewport. The hair deformer tools behave in a similar was as the **Hammer** deformers do, with the exception that they auto-select hair strands as you click on them.

### *Strength*

Determines how much the hair moves along with the cursor motion. For this tool, leaving the strength at 100% is recommended unless you require a very subtle motion.

### *Post Unwarp*

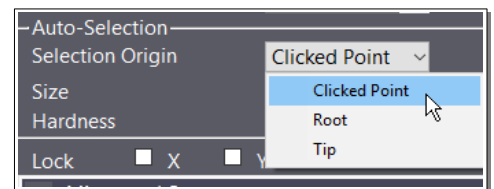
Post unwarp is essential to creating smooth and organic deformations to the hair strands without having to constantly touch them up. Typically this value should be left at 100% unless you are doing a very precise deformation and do not want the “smoothing” effect to work against it.

### *Auto Selection*

The parameters under the **Auto Selection** heading control how the initial click on the hair strand selects it for the following deformation.

### *Selection Origin*

The default behavior is for the Auto Selection to be centered on the initial point that you click on, and this is specified via the **Selection Origin** parameter. There are however situations where you may want the selection to originate from either the root or the top of the hair strand, so those options are presented as well.



### *Size*

The **Size** parameter will determine if the whole strand is selected and deformed ( 100%), or just a smaller portion of it ( < 100%)

## Hardness

The **Hardness** parameter functions in the same way here as it does for the selection brushes. A value of 0% yields the softest transition from selected to unselected, while a value of 100% yields a uniform, rigid selection.

## Strand Rotate



The **Strand Rotate** tool is used to rotate portions of the strand, usually to create “kinks”, waves, and other similar effects. Just like the **Rotate Hammer**, you can use the **Direction** options to determine what axis' ( relative to the viewport orientation ) to rotate around.

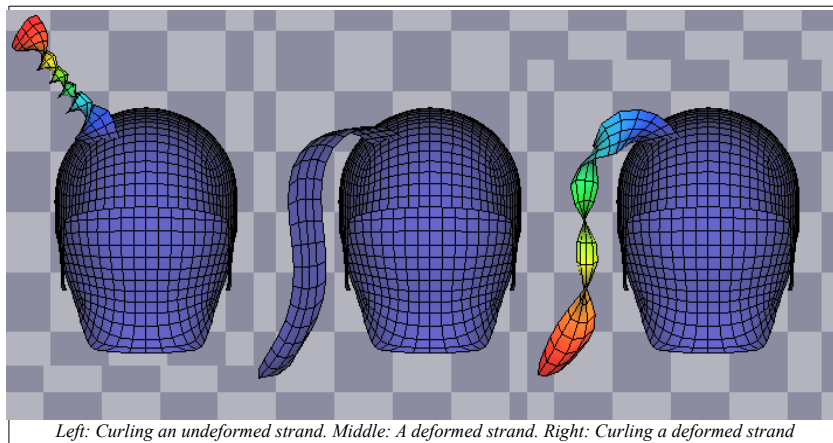
Please see the Strand Move for a description of the common hair parameters.

## Strand Curl



The **Strand Curl** tool will create a spiral deformation around the hair strand, in a way that's independent of it's style. i.e. Even if your hair is bend and twisted, the curl effect will still work the same was as as if the strand was straight.

The one thing to note is the default settings are different for this tool than other hair strand deformers. First, the **Selection Origin** parameter is set to **Tip** by default and the **Size** parameter is set to 100%. This is done so the default behavior is to curl the entire strand ( as illustrated ). You are of course free to changes these values to achieve a more localized curl effect.



Please see the Strand Move for a description of the common hair parameters.



## Strand Straightener



This tool is used to help iron out the kinks in the hair strands. However, it is not without limitations. So if a hair strand has been deformed heavily and you would like to undo those deformations, it is often easier to simply use the **Touchup Hammer** with the **Unmorph** type to restore the strand back to it's original shape, and then restyle it as desired.

Please see the Strand Move for a description of the common hair parameters.

## Strand Waver



This tool allows you to add waves to the hair. Click and drag on a hair strand ( or SHIFT-CLICK on multiple strands ) to create a wavy shape radiating out from the **Selection** Origin.

*Amplitude*

Determines the peak size of the wave.

*Wave Size*

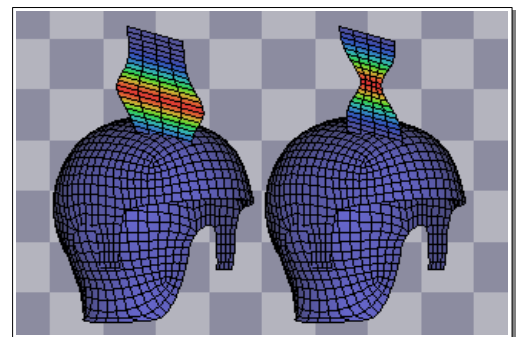
Not to be confused with Amplitude, this parameter determines the spacing between peaks and valleys in the wave. A Smaller value will yield a kinky curl effect while a larger value will yield a more subtle wave effect.

Please see the Strand Move tool for the common hair parameters.

## Strand Widen-Narrow



This tool will make the hair strand more wide or narrow depending if you drag the mouse up or down.



Please see the Strand Move tool for the common hair parameters.

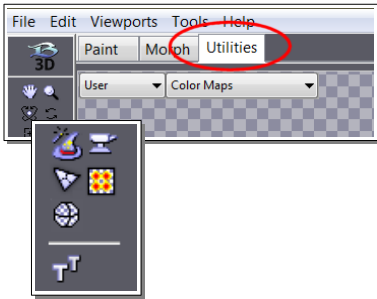
## Strand Volumizer



This tool will add overall volume to the hair strand. Please note that depending on the direction of the hair strands normal dragging the mouse up or down may have the opposite effect as to what you may expect. This is one of the few tools that is affected by the normal direction. You can flip the normal direction of the hair strand with the Strand Normal Flipper tool.

Please see the Strand Move tool for the common hair parameters.

## Utility Tools



This tab contains all of the tools that do not fit in the other categories. Although they don't directly modify textures or morph targets, they help facilitate their creation in a number of ways.

## Paint Setup Wizard

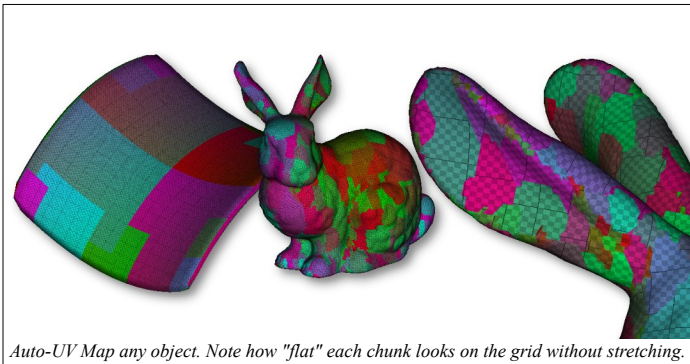


is a tool which enables you to take just about any 3D object and UV map and apply textures with the click of a single button. Long past are the days where you would have to spend hours UV mapping an object which is destined to live in the background of your scene. In fact, this tool works amazingly well for foreground objects as well. Here are a few things to consider before using auto-UV mapping in your project:

- The texture maps are moderate to high resolution (say 1500x1500 or more, rough estimate). If you are working on a texture for a real-time game with low resolution texture maps, then manual UV mapping techniques are preferred.
- The destination renderer is of high quality and **handles the UV mapping accurately**. The occasional renderer may feel that being off by a half pixel is acceptable, but that half pixel may be just enough to disrupt those perfectly painted UV seams. So, if the auto-UV mapped object looks great in Blacksmith3D, and the seams look “shifted” in your renderer, then this may be the case.
- The destination renderer **does not rescale** the texture. If this is the case, then you will want to create your textures using a size that your renderer will like and not rescale.
- The destination renderer **doesn't post-blur** the texture maps. Some major renderers do have a post-blur option that is enabled by default in the materials settings, which can be disabled or set to it's minimum value.
- The destination renderer **handles displacement maps well at the UV seams**. Using the **Bleed UV Seams** tool can help minimize the effect, but some renders simply don't like them at all. So if you are using displacement maps, be sure to run a few

tests in your renderer and make sure that all is good.

- Lastly, and this may seem obvious, is that your **renderer allows you to re-import the object** with the new UV mapping. If you change the UV mapping in Blacksmith3D, paint the texture, and then apply the texture to the **original UV mapping**, then the texture will appear to be randomly broken up across the object. For example, if you are creating a **skin** for an object in a game, then you will want to **utilize the original UV mapping** and not auto-UV mapping.



*Auto-UV Map any object. Note how "flat" each chunk looks on the grid without stretching.*

In a perfect world, all renderers would handle UV seams accurately and predictably such that we would never have to consider them again, letting Blacksmith3D do it's magic. Until that day comes, run a few tests and make sure that your platform handles them well before proceeding.

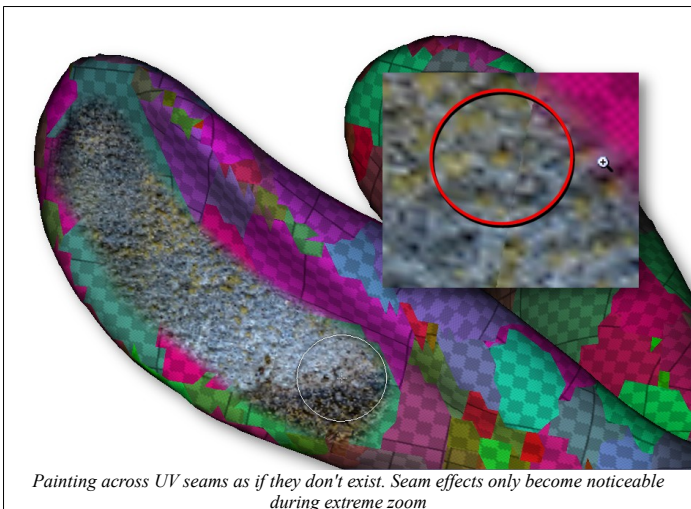
### *Create and assign these maps....*

allows you to specify which map types are created and applied to the object. By default, only **Color** is checked. In addition, you can specify **Bump**, **Transparency** (Opacity), **Displacement**, **Ambient** and **Specular** maps.

### *Width & Height*

specify the dimensions of the texture maps that are about to be created. If you plan on resizing any of the maps immediately after creating them, then it is very important that **you specify the smallest size** here, and only enlarge them afterwards. If you **shrink a texture map after auto-UV mapping**, then the seams from one "chunk" may become

too close to those of another "chunk" **destroying Blacksmith3D's ability to paint beyond the seam smoothly.**



*Painting across UV seams as if they don't exist. Seam effects only become noticeable during extreme zoom*

### *UV Mapping*

contains a few options to control how auto-UV mapping behaves. First is the **Auto-UV Map** checkbox which enables or disables

the UV mapping. You may wonder why this option is even here to begin with, and the answer is this; If you have a model that you know **already has good UV mapping**, and you simply want to **create maps** and automatically **assign them to all of the materials** and channels (color, bump, etc.) then you can use this tool with UV Mapping disabled to quickly achieve this. **Be careful though**, because if the UV mapping is designed for **multiple UV mapping regions** (e.g. one map for the head of a character, and a separate map for the body), then you should **create and apply the maps manually** to the appropriate materials.

## Quality

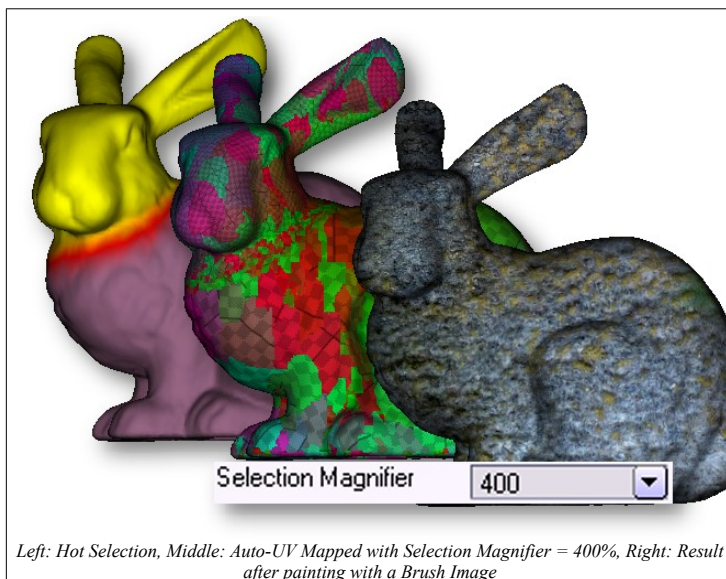
determines how neighbouring polygons are joined together, creating “chunks” of polygons in the UV maps. Reducing this parameter will result in less UV seams, however, the texture stretching will increase as a result. As mentioned previously in this manual, our philosophy at Blacksmith3D is to favor flat, unstretched UV mapping, but we'll leave it up to you to decide.

## Selection Magnifier

... ah, this is where it get's interesting. Lets say you have a character and you want to paint more detail in the face, and less elsewhere on the body. Using this option, you can make the **most selected** area of the model contain more resolution than the **least selected** area by this percentage.

It may be a little tricky at first, since Blacksmith3D will only auto-UV map objects that are selected at least a bit, so this is what you do.

- Use the **Picker** selection, type set to **Object** with **Strength** set to **10%** and click on the object.



- Then, you can utilize any selection tool to select the desired portions of the object more, holding the **SHIFT** key to add to the current selection, rather than replacing it. Don't forget to set the **Strength** back to **100%**.
- Set **Selection Magnifier** in the **Paint Setup Wizard** to something

like 400%.

- Click **Execute** and then see how the pixels look smaller where the object was selected the most, and larger where it was selected the least. Remember, when it comes to pixels, smaller is better.

### *Additional Options*

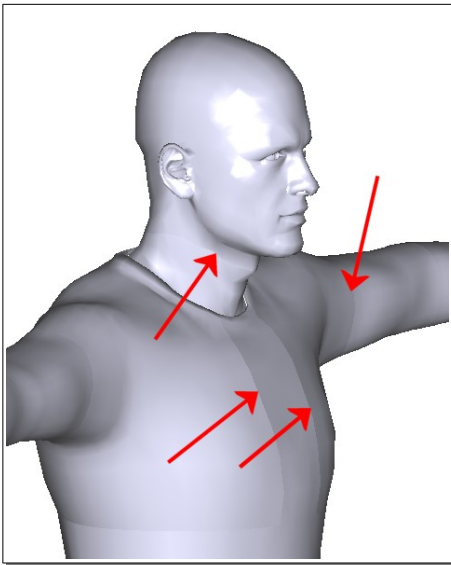
**Clear Existing Maps** will remove all existing references to the maps currently assigned to the object. **Make Grid In Color Map** creates a colorful grid in the newly created color map, you can visualize the resolution, and the placement of the UV seams. When you first start using this tool, we recommend that you keep this option enabled so you can **get a better understanding** of this new way of UV mapping, and see exactly what is going on. Finally, **Display UV Mapping** will show an overlay of the current UV mapping in the viewport for you inspection.

### *Execute*

Click the **Execute** button to perform the paint setup wizardry based on the options that you specified. If your workflow and destination renderer allows you to utilize auto-UV mapped objects issue free, then you will find yourself clicking this button a lot, and saving yourself countless hours of UV mapping, so you can focus on what really matters; painting great textures!



## Weld Vertices



This tool is essential for Poser(R) or DAZ Studio users who wish to create a morph target that spans multiple body parts. Choose this tool and then click on the "Weld" button in the tool window. All of those unsightly seams will now be welded together.

Also note, that when exporting OBJ file(s), the groups are saved UNWELDED by default. You need not worry about using this tool to unweld the object beforehand, unless you have a specific situation that requires you to.

Technical note - All of the vertices that are discarded from the welding process are kept in sync with morphing process. This is essential for morph targets that span multiple body parts (full body morphs). So, when the object is unwelded, the formerly discarded vertices will have the same positions as those that they were welded to.

### *Precision*

Determines how precise the calculations for the vertex matching must be for two vertices ( on either side of a seam ) to be determined as identical. If the **precision** is set to 5, and the maximum dimension of the object is 1 unit, then maximum distance between two points should be no more than 0.00001 units to be considered identical. So, a **smaller number** is more forgiving, but may result in inaccurate matching. A **larger number** is more precise, but may fail to match some vertices on the seams.

### *Weld*

Welds the vertices together in a **temporary** way to eliminate the seams. To undo the weld, click **Unweld**.

### *Weld Permanently*

Behaves the same as **Weld**, but the geometry is permanently altered. Use this option when you want to export the object with the welding intact.

### *Unweld*

Restores the original seams after **Weld** has been used.

## Subdivide Object

Many of the tools in Blacksmith3D work best on moderate to high resolution models, and working with low resolution models may provide some challenges. We provide a simple subdivision tool to account for this. It is important that you understand how a subdivided object will affect your workflow. For example, if you subdivide an object and then create a morph target, it will not be compatible with the original ( un-subdivided ) object. If you paint a texture ( on existing UVs ), then the resulting texture will indeed be compatible with the original object ( with some considerations, see **Smooth Vertices** below ).

### *Maximum Polygons*

Instead of specifying the number of subdivision iterations, and guessing how many polygons will be in the result, we simply provide a maximum number of polygons allowed in the subdivision. The object will be subdivided with as many iterations as possible until the maximum has been reached. For ideal performance inside Blacksmith3D, the value may be anywhere between 20,000 and 100,000 polygons, although this is merely a guideline.

### *Smooth Vertices*

When this option is checked, with each iteration of the subdivision, the vertices will be smoothed ( averaged ) with the surrounding vertices, resulting in a rounder surface. If you are subdividing a low polygon object for the purpose of texture painting, then it is recommended that you DO NOT smooth the vertices, since the resulting texture may look stretched and distorted when applied to the original ( un-subdivided ) object. If you intend on using the object in its subdivided state from this point forward, then

you may wish to smooth the vertices if you want smooth and organic curves in the resulting geometry.

### *Replace Original Object*

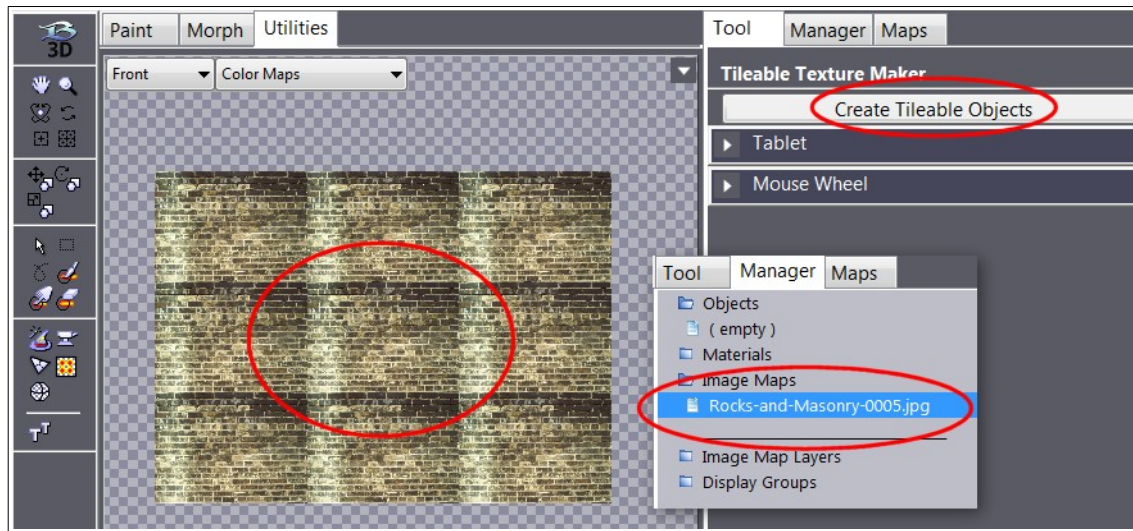
When this option is checked, the object that is being subdivided will be replaced with the subdivided version. Likewise, if it is unchecked, the subdivided object will appear as a new object, and will be moved ( transformed ) in the viewport so it does not overlap the original object ( if the **Offset subD in viewport** option is checked ).

### *Offset subD in viewport*

When this option is checked and **Replace Original Object** is unchecked, the resulting subdivided object will be moved ( transformed ) in the viewport to avoid the confusion of having two nearly identical objects overlapping with each other.

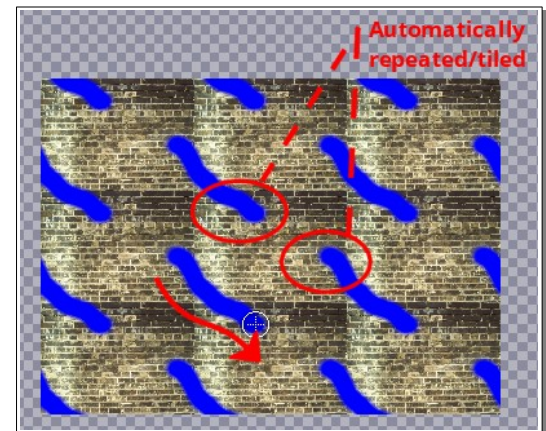
## Tileable Texture Maker

This tool will use the highlighted **Image Map** in the manager to create a 3x3 grid that can be painted on. By painting mainly in the center tile, allowing the brush strokes to overlap into the outer tiles, you can create a repeatable pattern without seams.

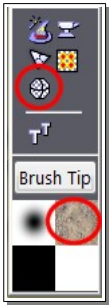


Here we show a single paint stroke that is focused on the center tile, and notice how the paint strokes wrap around. In practice, you would probably want to use a **Brush Image** and use the Brush Tile Setup tool to create a pleasing tileable texture.

For more information, please see the Creating Tileable Textures tutorial.



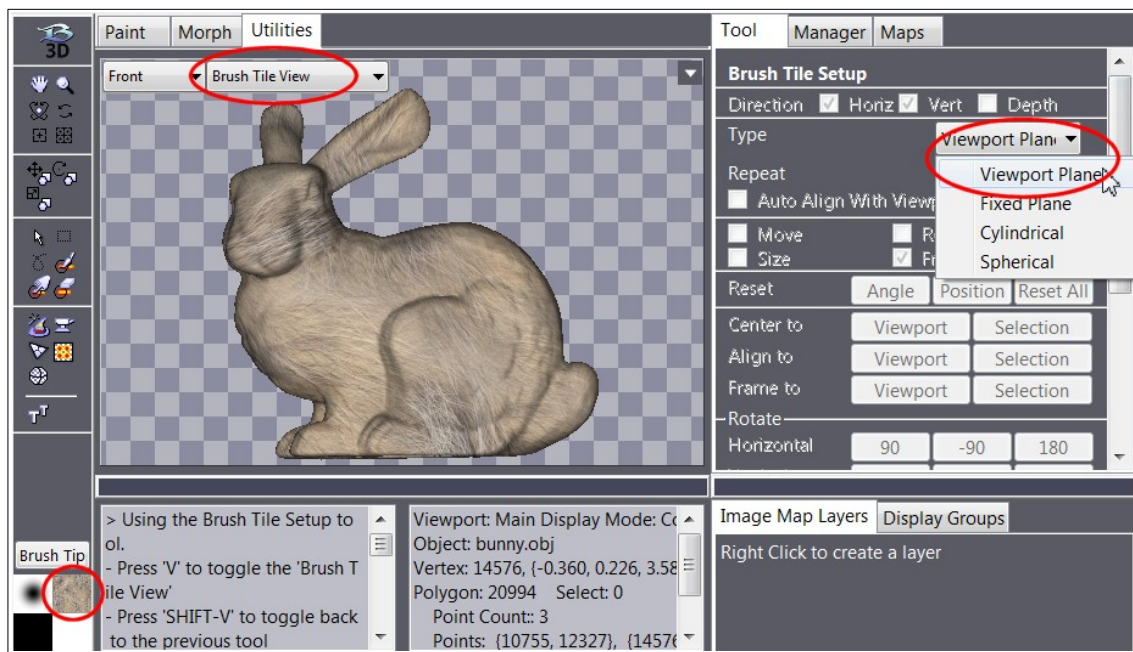
## Brush Tile Setup



Next to the basic paint brush, this is probably the most important feature in Blacksmith3D for texturing objects. It allows you to control exactly how the **Brush Image** is mapped to the object being painted. It is very similar to UV mapping, but should not be mistaken for it.

For the Brush Tile Setup tool to function, there must be a Brush Image loaded. Although its icon exists in the **Utilities** tab, it is highly recommended that you use the **SHIFT-V** hotkey to toggle it on and off quickly while painting.

The Brush Tile Setup tool is often used in conjunction with the **Brush Tile View** display mode, which shows you what the objects would look like if painted with the current **Brush Image** and the current **Brush Tile Setup** parameters.

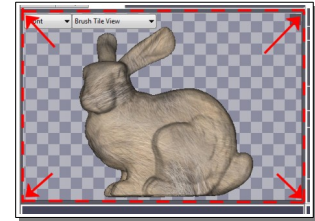




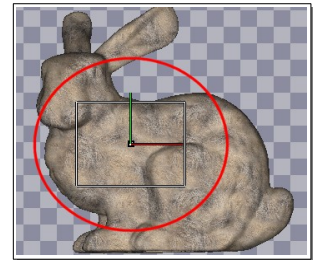
## Type

Defines how the **Brush Image** is mapped to the object(s).

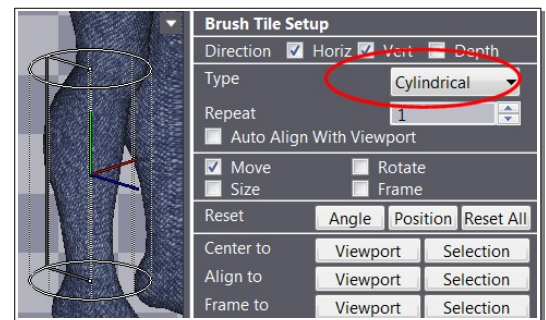
**Viewport Plane** maps the image to the current perspective of the viewport, adjusted for the Brush Image's aspect ( it will not stretch if the aspect of the viewport and the image are different ).



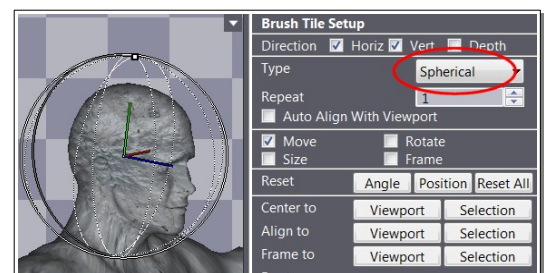
**Fixed Plane** maps the image to a rectangular region which is fixed in space, independent of the viewport perspective. The mapping is repeated outside the rectangle is repeated infinitely, which makes it useful to use **Tileable Textures** whenever possible ( see the Creating Tileable Textures tutorial ).



**Cylindrical** maps the image in a cylindrical region, which like the **Fixed Plane** is independent of the viewport perspective. It is most useful for texturing objects ( or portions of objects ) which are somewhat cylindrical in shape themselves. Portions of the surface that match up with the caps of the cylinder ( top and bottom ) will usually be distorted and should be avoided.



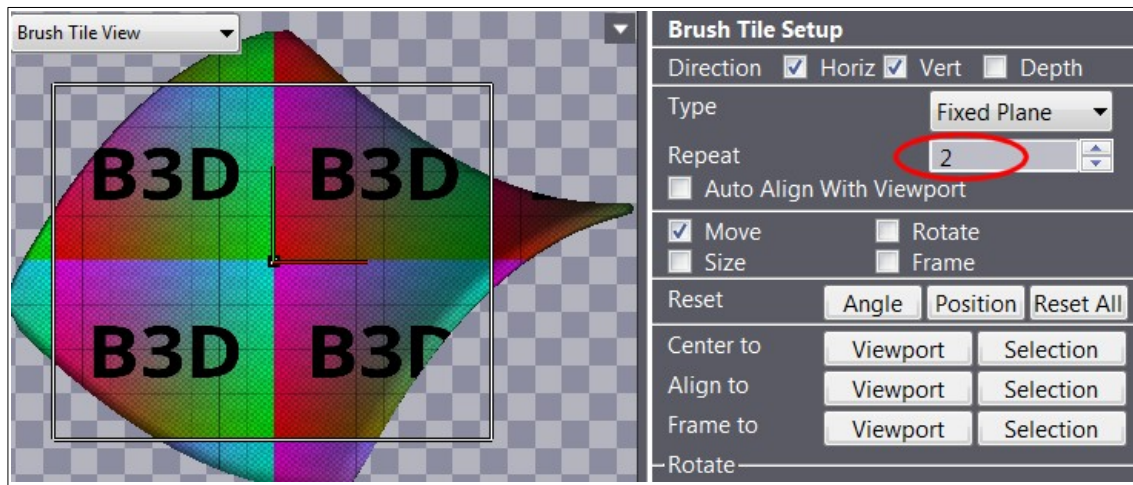
**Spherical** maps the image in a spherical region independent of the viewport perspective. Care should be used around the polar regions of the mapping as they are usually heavily distorted. They can be touched up after the fact using a **Fixed Plane** mapping.





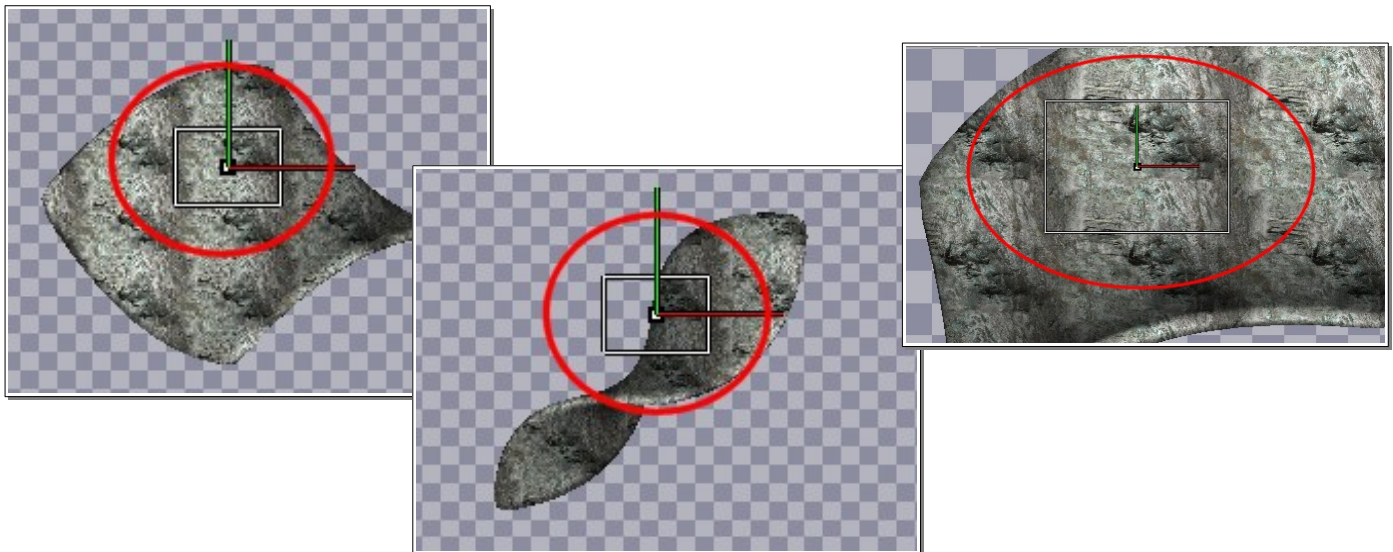
## Repeat

Determines how many times the **Brush Image** is repeated within the boundaries of the current mapping type. For example, if the **Type** is set to **Fixed Plane**, and the **Repeat** value is set to 2, then two impressions of the brush image will appear in the horizontal direction and two impressions will appear in the vertical direction.



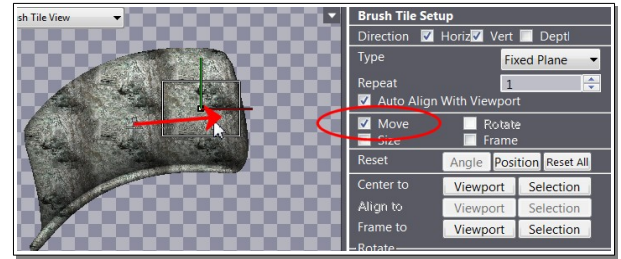
## Auto Align With Viewport

Mainly designed for use with the **Fixed Plane** mapping type, this feature forces the plane to always be aligned with the viewport, while preserving it's fixed position and size. It allows the painted texture to be consistent when zooming and rotating the view.



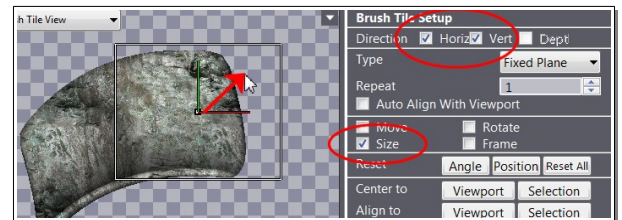
## Move

When this option is checked, clicking and dragging in the viewport results in the current mapping being moved in the horizontal, vertical and/or depth directions based on the mouse motion and the **Direction** options.



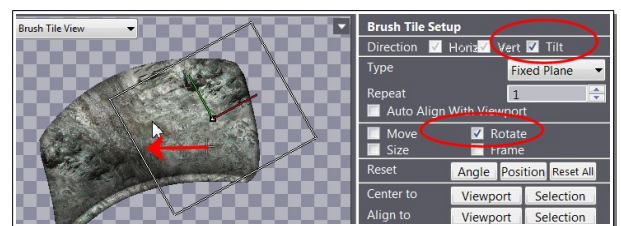
## Size

When this option is checked, click and dragging in the viewport results in the current mapping being scaled in the horizontal and/or vertical directions based on the mouse motion and the **Direction** options.



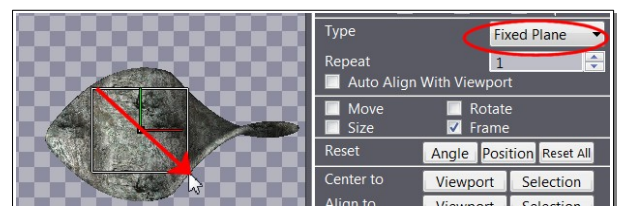
## Rotate

When this option is checked, clicking and dragging in the viewport results in the current mapping being rotated in the horizontal, vertical and/or tilt directions based on the mouse motion and the **Direction** options.



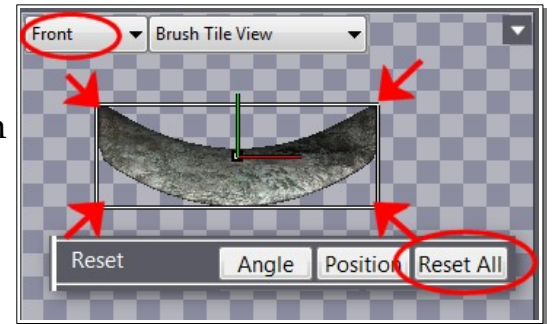
## Frame

When this option is checked, clicking and dragging in the viewport results in the current mapping being framed in a rectangular region.



## Reset

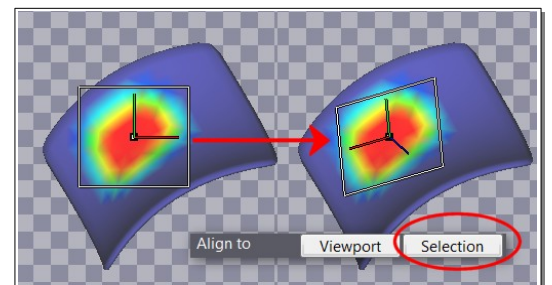
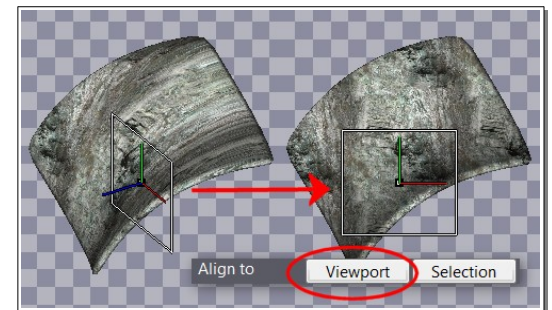
Provides three buttons for resetting the angle of the current mapping method ( so it becomes front facing ), the position ( centered at  $\{0,0,0\}$  ) or all, which will reset the angle, position, and the scale ( by framing it to the bounds of the objects in the scene ).



## Align To

Will rotate the mapping such that it is aligned with the Viewport or Selection. Aligning with the viewport means that with the current viewport angle, the mapping will be facing it, which is most obvious for the **Fixed Plane** type, and less obvious with the Cylindrical or Spherical mappings.

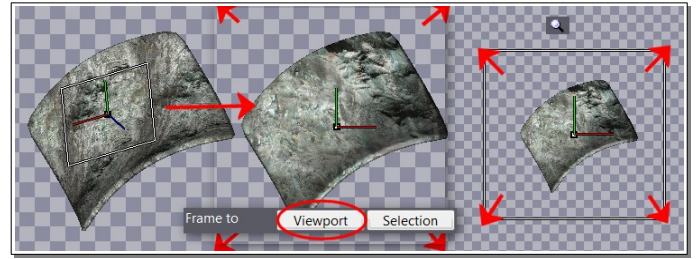
Aligning to **Selection** will orient the mapping so it is matches the selected surface ( matches the average surface normal of the selected region ), which works best when a partial patch of the surface is selected, and not the whole object.



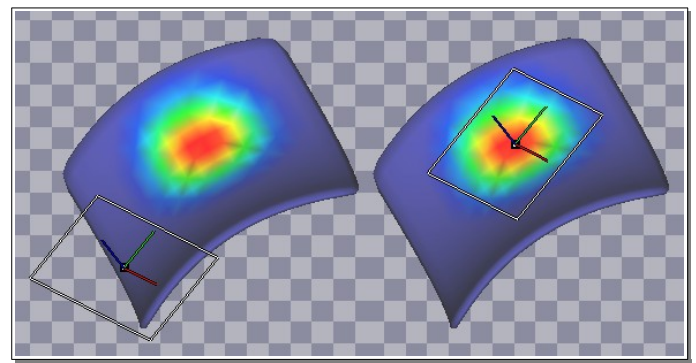


## Frame To

Frame to **Viewport** will set the mapping so it matches the current viewport perspective. As such, the graphic representing it ( if using Fixed Plane ) will immediately become invisible since it will be at the very edge of the viewport. It is similar to using the **Viewport Plane** method, except it will stay in the same, even after rotating, zooming, etc.



Frame to **Selection** will set the mapping to it is framed around the current selection.



## Rotate

Rotates the mapping by 90, -90 or 180 degrees in the horizontal, vertical, or tilt directions ( all relative to the viewport ).

## Zeroing

Sets the position of the mapping to zero in the absolute sense ( X, Y and/or Z ) or relative to the viewport ( U, V and/or W ). Zeroing in the viewport will result in the mapping being centered in the current viewport orientation ( will always appear directly in the center of the current ).

## Texture Transformer

The **Texture Transformer** is a utility to convert textures between different standardized characters. It is designed for use with characters designed for Poser™. To convert a texture map set from one character to another, a conversion package is required.

Examples include...

- Victoria 4.2 ( DAZ ) to Dawn ( Hivewire )
- Victoria 4.2 to Genesis 3 ( DAZ )
- Etc.

Many conversion packages are included with the purchase of Blacksmith3D-Pro or Texture Transformer ( stand alone application ) and some are available as a separate purchase. Please see [www.blacksmith3d.com](http://www.blacksmith3d.com) for more details about the conversion packages available.

### *How it works*

The Texture Transformer does not modify the UV mapping of the destination object in any way, rather, it creates new textures that fit the object. It does so by matching up the surfaces of both the source and destination objects and does *per pixel* calculations to transfer the texture. The benefits of utilizing this method are...

- UV seams are as good as the original object/textures. If the source object's textures are blended at the seams, so will the destination
- No “tricks” required in your destination renderer, like changing the UV's, changing the material structure, etc.
- Fast conversions ( see next paragraph )

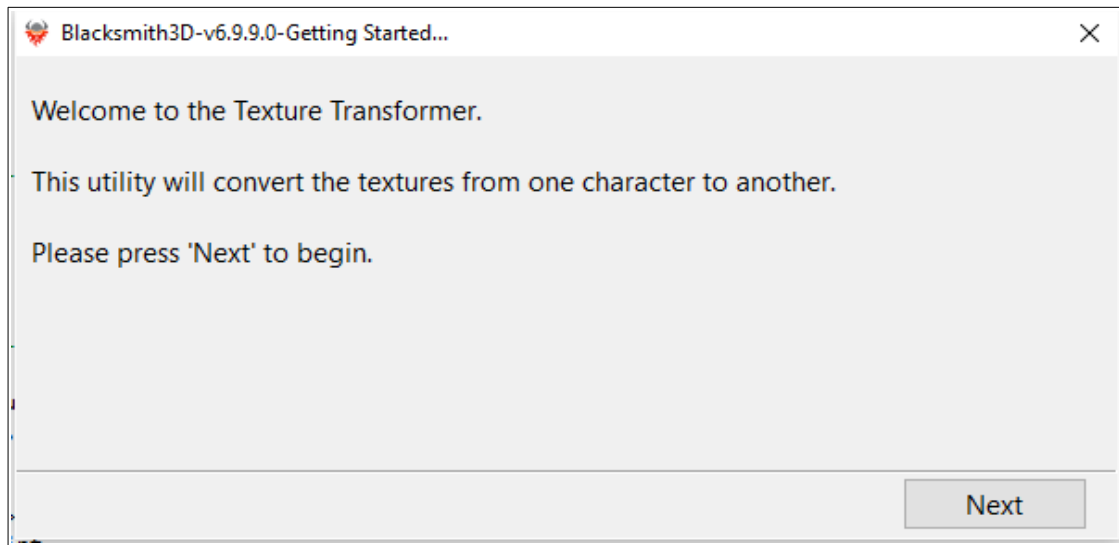
A common question is... why are the conversion packages so large?

A typical conversion package is around 150 MB, and it contains quite a bit of *pre-computed* information about the conversion. When the end user ( you ) uses a conversion package, the software does not have to perform millions of complex calculations to convert high resolution texture sets. It simply relies on the pre-computed information and performs the conversion quickly.

## Step by step walkthrough

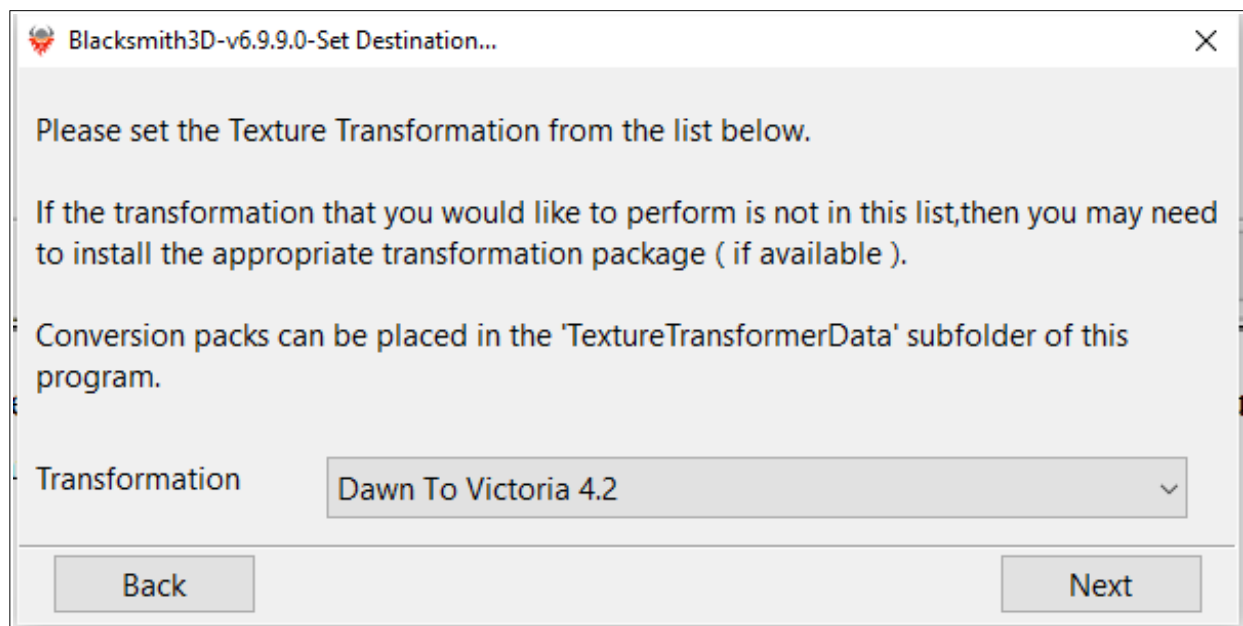
### Getting Started

Start off by launching the Texture Transformer, from either the stand-alone application file, or from the **Utilities** section of Blacksmith3D. The first window is a simple introduction, so click on **Next**.



### Set Destination

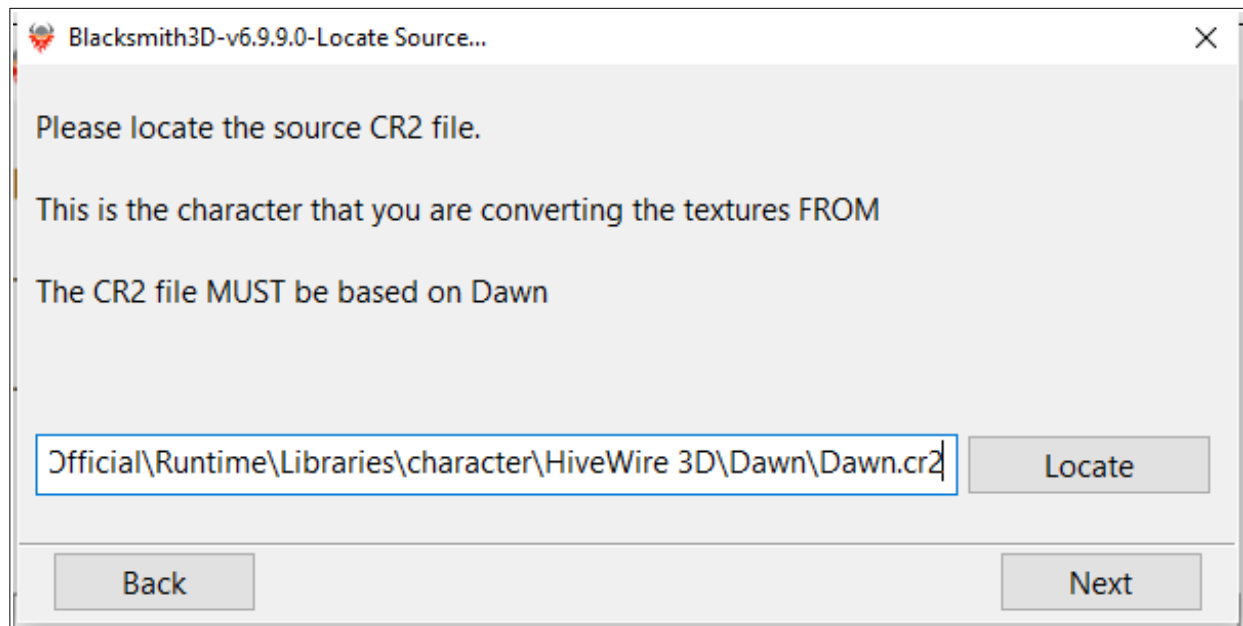
The next window will ask you to choose what conversion you would like to perform. Choose the transformation from the drop down box, and then click **Next**. For this example, we will choose Victoria 2.3 to Dawn.





### Locate Source

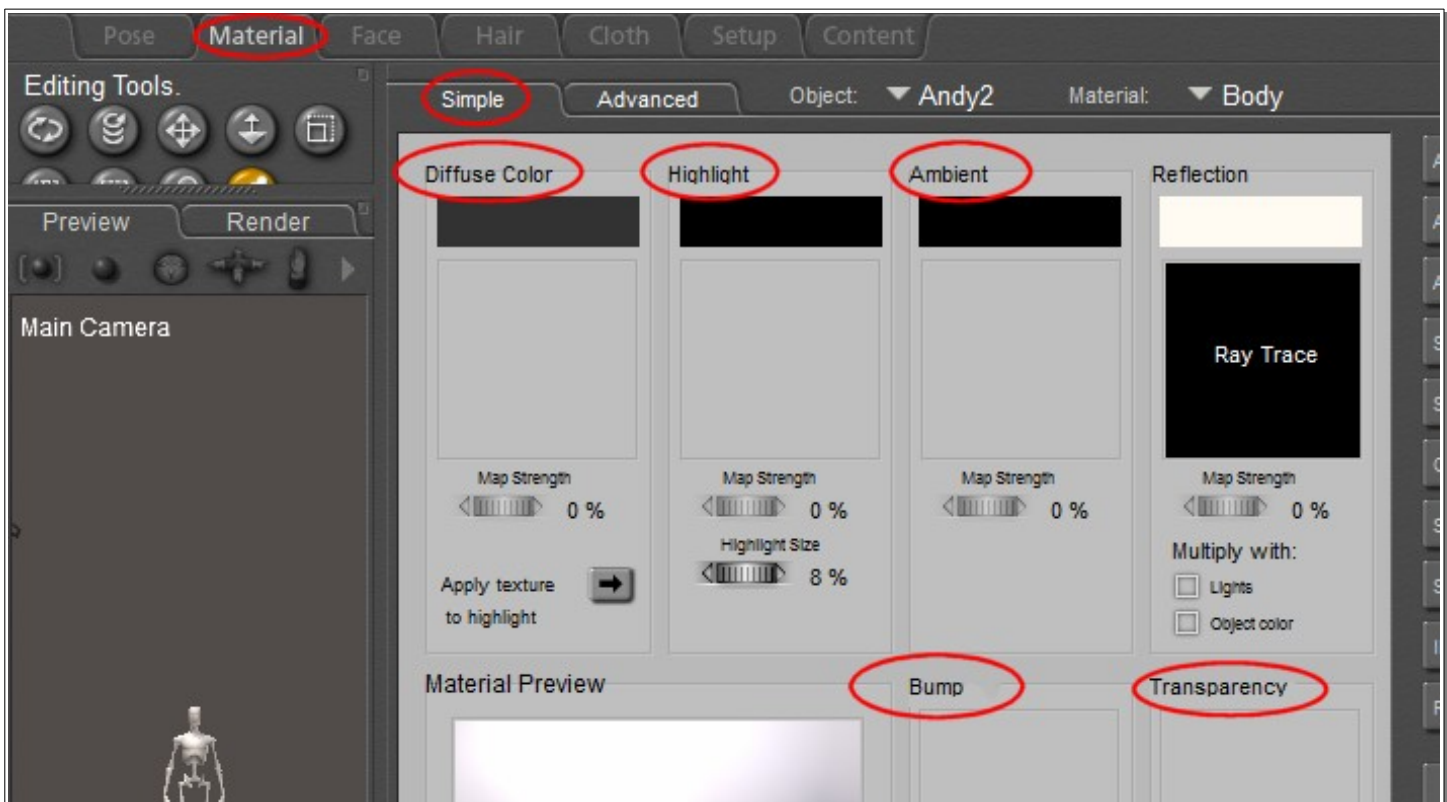
Next, you are instructed to locate the source CR2 file ( Poser character file ) that you would like to extract the textures from. Click on the **Locate** button, use the file dialog to locate the CR2 file, and then click **Next**.



### Considerations for CR2 Files

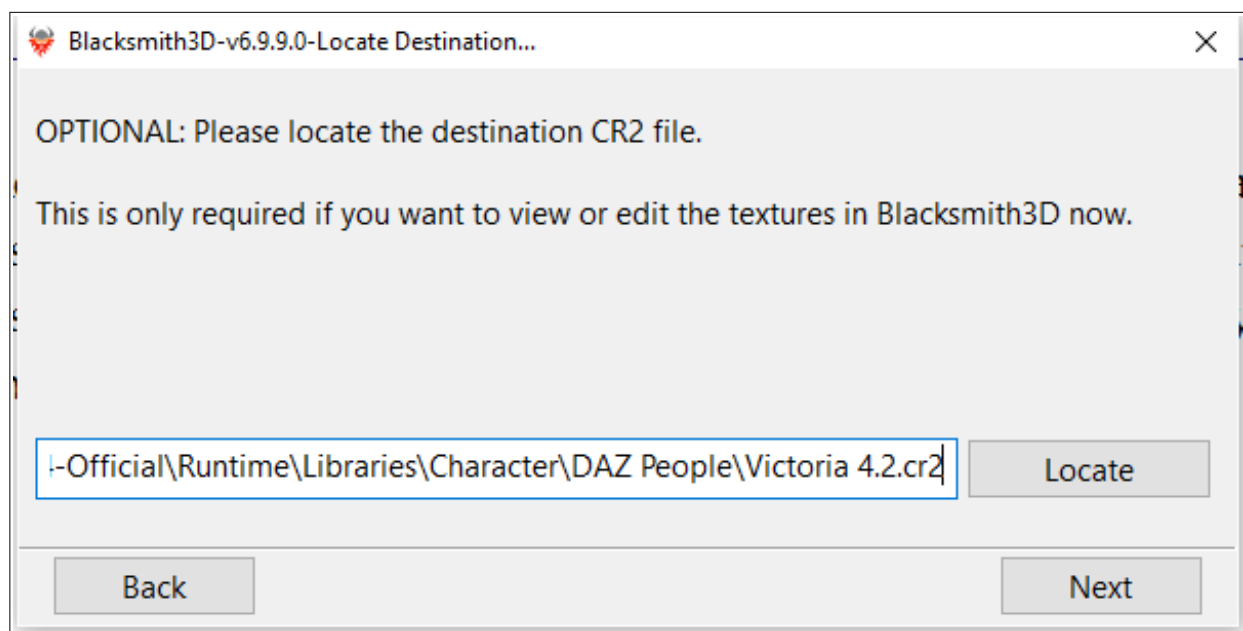
At this point, we will point out a few things to consider...

- Both CR2 and CRZ ( compressed CR2 ) files are supported.
- Not all CR2 files are supported. Examples of unsupported CR2 files are
  - CR2 files that contain custom geometry in the form of “Replacement Body parts”
  - CR2 files that contain python scripts such as DAZ “Poser Companion Files”. For this type of CR2 files, first resave the CR2 to the library to a temporary location, and then use that converted CR2 file.
- The maps in the CR2 should be “simple maps”. Complex shader trees that refer to more than one map per material channel are not supported. You can check this by opening the CR2 file in Poser, clicking on the **Material** tab.
- If you wish to convert map(s) that are currently not supported by Blacksmith3D, you can still convert them by creating a temporary CR2 file, assign those maps to supported material channels ( e.g. Diffuse Color ) and perform a transformation. Then you can take the resulting maps, rename appropriately, and manually assign them inside Poser.



**Locate Destination ( optional )**

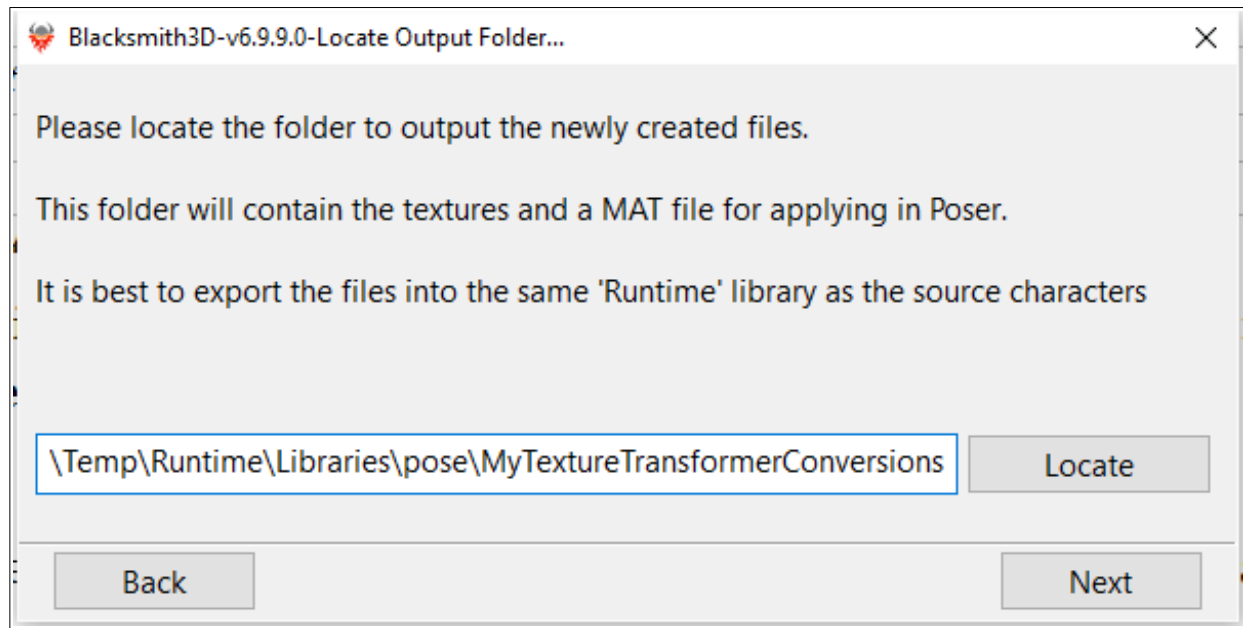
The next step is only available if you are using the Texture Transformer from within Blacksmith3D, and it is optional. If you wish to have the resulting character loaded into Blacksmith3D after the conversion has been completed, then you must specify the destination CR2 file.



The same limitations for the source CR2 also apply to the destination CR2 files.

### Locate Output Folder...

Now it is time to specify where the newly created files are stored. Click on **Locate** and locate the folder in your Runtime structure where you would like to store the files.



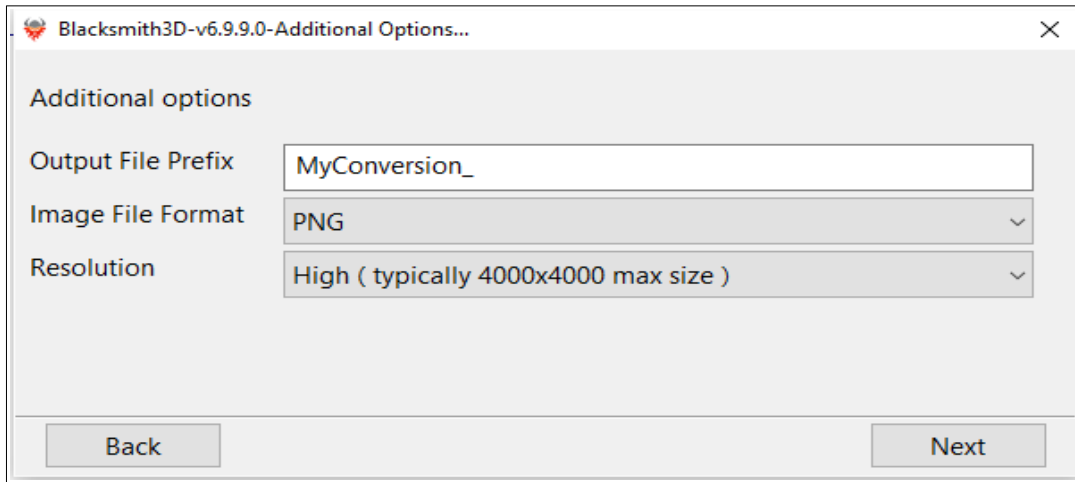
### Considerations for Output Folder

Please note that the MAT file and the texture maps will be located in the same folder. So, there are few scenarios that you may consider...

- If you are making this conversion for a quick project, and are not concerned with moving or redistributing the files, then simply export all of the files to a folder in the **Pose** library. e.g.
  - ...\\Runtime\\Libraries\\pose\\MyTextureTransformerConversions
- If you prefer to have the resulting texture maps in the **Textures** library, then export the files there, and move the resulting **MAT** file and thumbnail to the **Pose** library
  - ...\\Runtime\\Textures\\MyTextureTransformerConversions
- The key point here is to **export to the location where the texture maps should be**, and optionally relocate the MAT file. Otherwise, you may get error messages about missing textures and have to manually locate them.

## Additional Options

Here we can specify the options for the output files.



### Output File Prefix

All exported files will have this prefix at the beginning of the file name. e.g.

- MyConversion\_MAT.pz2
- MyConversion\_Head\_Color.PNG
- MyConversion\_Body\_Bump.PNG
- etc.

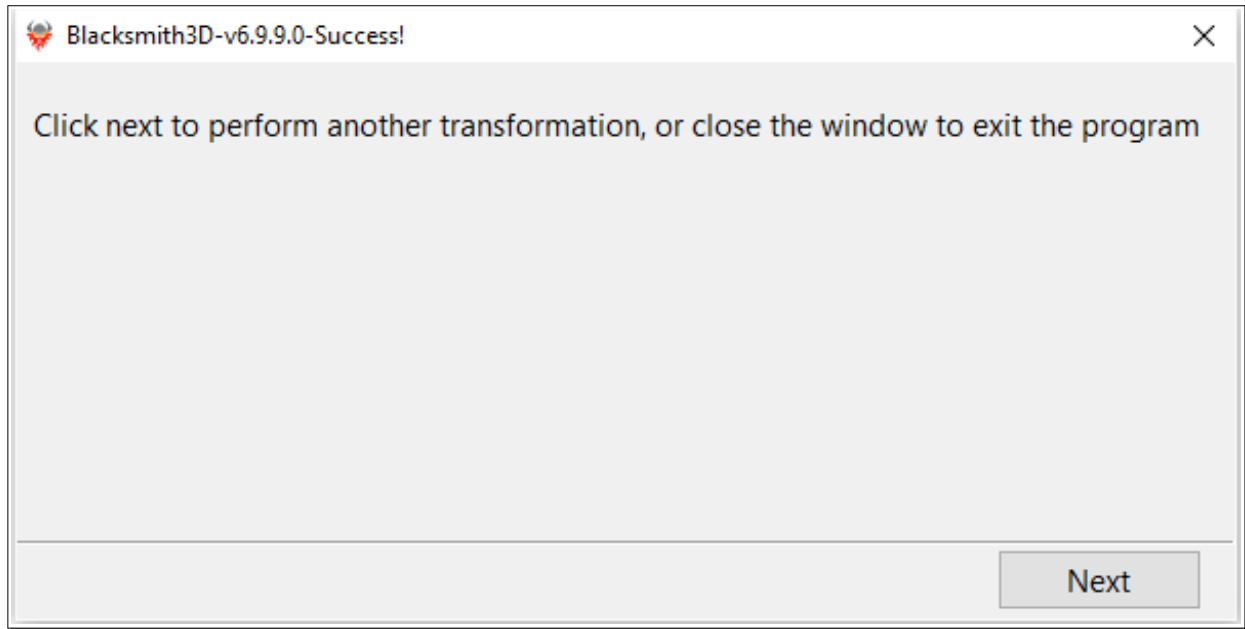
### Image File Format

Specifies the file format for the texture maps. JPG and PNG files are supported. If you intend on editing the resulting files, then PNG is recommended since it is a loss-less format. If you would prefer to save storage space, then choose JPG.

### Resolution

This option is here mainly for convenience. All transformations are performed internally with the High resolution setting. Setting the resolution to medium or low will result in the maps being resized after the conversion. When in doubt, use high resolution.

Clicking **Next** will begin the transformation process. Please note that if any files cannot be located automatically, you may be prompted to find them manually.

*Success*

This window indicates that the transformation was successful. At this point, you can click **Next** to perform another transformation, or you can close the window to exit the Texture Transformer.

If you are using the Texture Transformer from within Blacksmith3D, then closing the window will take you back to the main Blacksmith3D interface. If you specified a destination CR2 file, then the resulting character will be loaded in the viewport with the newly converted texture maps applied. If you are using the Texture Transformer stand alone application then the program will end.

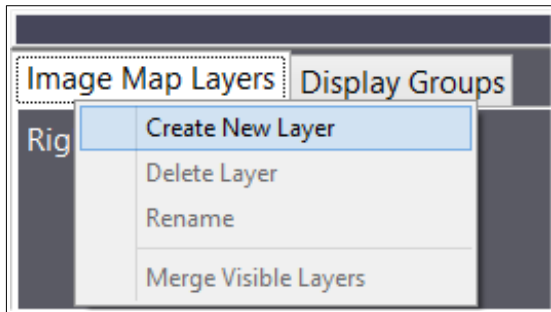




## Image Map Layers

Many 3D applications use the word **Layers** quite liberally, so let us be clear. **Image Map Layers** in Blacksmith3D allow you to create an arbitrary number of stacked layers, that are blended together using a wide variety of **Blending Types** such as **Lighten**, **Darken**, **Overlay**, **Dodge**, **Burn** and a whole bunch of others. You can create very complex effects **utilizing the same techniques that you use in 2D painting**, the only difference being that you are painting **directly on your models**. Since complex 3D models can utilize multiple texture maps, our layers extend onto all texture maps, and need not be individually maintained from map to map.

### Creating New Layers

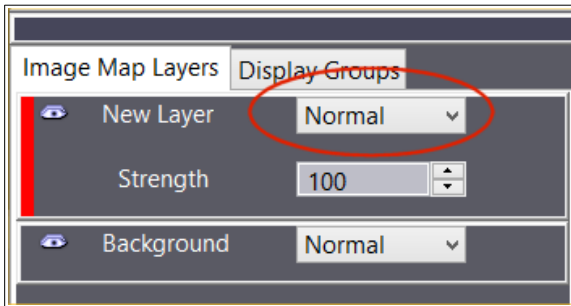


To create a new layer, simply right click in the **Image Maps** section of the **Layers** window, then choose **Create New Layer**. You will then be prompted to give the layer a unique name, and then it will be created.

Now, notice that newly created layer has a red marker in front of it. That is to indicate that this is the **current layer**, and any painting operation will only affect it, and not the other layers. Also please note that whole map operations such as **Clear**, **Invert Colors**, etc. will only affect the current layer as well.

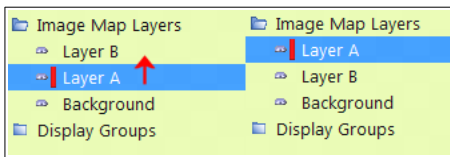
## Changing the Layer's Blending Mode

By default, the blending mode of that layer will be **Normal**, which will cause the pixels on top to be blended over the pixels on the bottom, according to the alpha mask (transparency, opacity) of the layer. New layers are created with a blank alpha mask, so the layer is completely transparent until something is painted on it.



To change the blending mode, simply click on the drop-down box for the layer and choose from one of many blending modes. Most of these modes behave identically to the ones you are familiar with in your favorite 2D painting application, while some offer unique functionality.

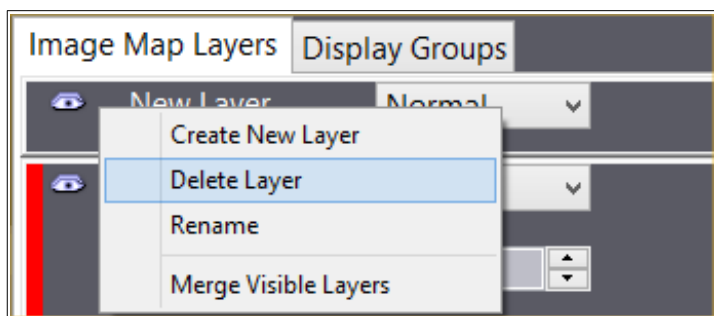
## Reordering Layers



You can change the ordering of the layers simply by dragging one layer over the next in the **Manager** or in the **Image Map Layers** window.

## Deleting and Clearing Layers

To delete one or more layers, simply highlight them in the manager, right click and then choose **Delete Layer(s)**. Please note that this is not undo-able, so do so with care. When deleting the last layer, the texture maps will revert to single layers with no alpha transparency.

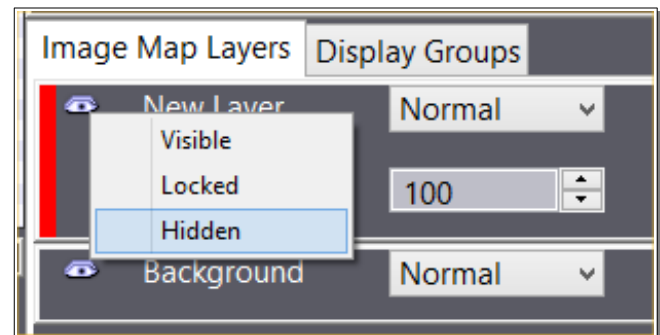


To clear the pixels in a layer without deleting the layer, then simply make sure the layer is current (click on it so the red marker indicates that it is current), then right click on the appropriate maps in the **Maps** window, and then choose **Clear**.

### *It's in the Details*

When working with layers, you may often apply a paint stroke, only to see it disappear, leaving you scratching your head, wondering what happened. In Blacksmith3D, as you in the process of creating a brush stroke, it will appear on top of everything, with the normal blending mode. When you finish the paint stroke, the paint will then be applied to the current layer (as indicated by the red marker in front of it).

If there is a layer in front of the current layer, you may not see the newly applied paint stroke, and conclude that some sort of error has occurred. Please take extra care in these situations, and feel free to **hide** the layers in front of the current one by clicking on the **eye** icon twice, or right clicking it and selecting **hidden**.



## Display Groups

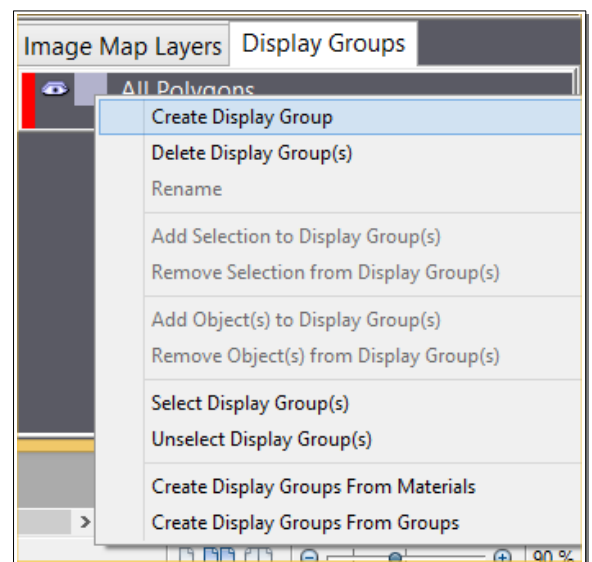
Display groups in Blacksmith3D act like layers for polygons. You can create a display group using the selected polygons, and then lock or hide that group on demand. Polygons can belong to multiple display groups. For example, a character may have a display group called **Head**, which contains all of the polygons in the head of the character, and it may have another display group called **Nose**, which contains the polygon of the nose. Note that in this situation, the **Nose** polygons are assigned to both the **Head** display group and the **Nose** display group.

Display groups do not produce a final product in themselves, but they are merely used to help you organize your workflow, and allow you to dynamically hide and lock portions of the surface.

You can right click on any display group to get the context menu which allows you to edit them in a number of ways. By default, there is always an **All Polygons** group, which as you may have guessed, contains all polygons for all objects in the project.

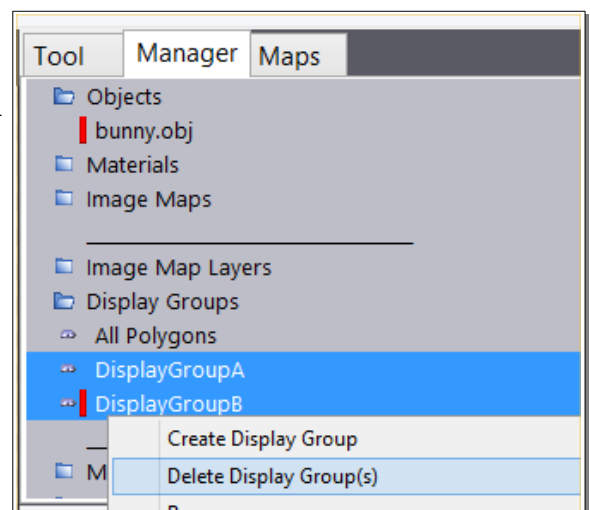
### Create Display Group

Creates a new display group using the currently selected polygons. Note that polygons can be added or subtracted later using other options in the context menu.



### Delete Display Group(s)

Will delete the display group that was right clicked on, or will delete multiple display groups if they are highlighted in the **Manager**.



### **Add Selection to Display Group(s)**

Add the selected surface to the highlighted Display Groups. Works best using polygon (as opposed to vertex) selections since it is more obvious which polygons will be affected.

### **Remove Selection from Display Group(s)**

Removes the selected surface from the highlighted Display Groups. Works best using polygon (as opposed to vertex) selections since it is more obvious which polygons will be affected.

### **Add Object(s) to Display Group(s)**

Adds the current object to the highlighted Display Groups, including all hidden and locked geometry. In addition, any object that is highlighted in the Manager will be added as well.

### **Remove Object(s) from Display Group(s)**

Removes the current object from the highlighted Display Groups, including all hidden and locked geometry. In addition, any object that is highlighted in the Manager will be removed as well.

### **Select Display Group(s)**

Selects all of the surfaces assigned to the highlighted Display Groups.

### **Unselect Display Group(s)**

Unselects everything that is assigned to the highlighted Display Groups.

### **Create Display Groups From Materials**

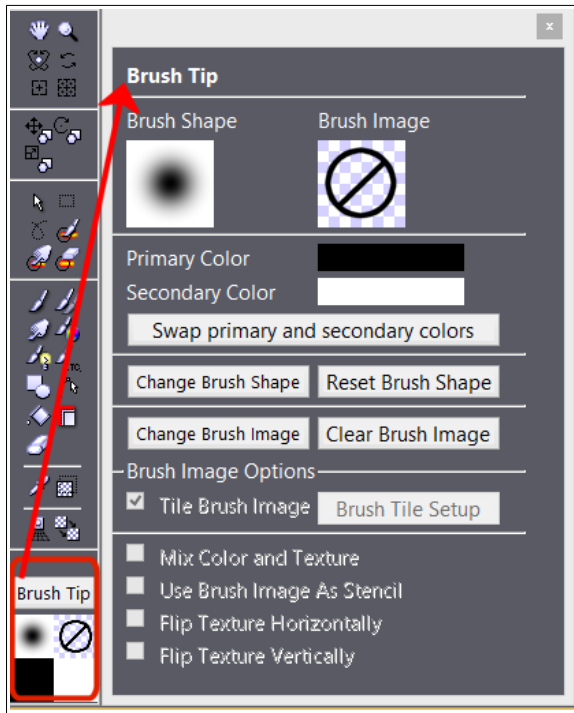
Creates a new display group for each material.

### **Create Display Groups From Groups**

Creates a new display group for each group. Groups are as defined in OBJ file, etc.

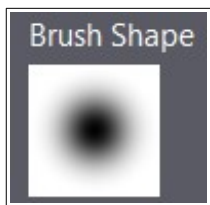


## Brush Tip Window and Mini Panel



Contains options for the brush shape, color and image (texture). Additional options are also available available for finer control.

The Mini Brush Tip panel at the bottom-left corner of the interface allows you to access the most commonly used features, such as the **Brush Shape**, **Brush Image**, **Primary Color** and the **Secondary Color**. For more advanced features, click on the **Brush Tip** button to open the **Brush Tip Window**.



**Brush Shape** - Determines the shape of the paint or selection brushes. Choose from one of the preset shapes, or import custom shapes from image files (e.g. PNG, JPG, etc) via drag-and-drop or by clicking on the icon and using the Open File dialog. Use **ALT-CLICK** to reset the brush shape back to the default.



**Brush Image** - Changes the Brush Image used by the relevant paint tools. Choose from one of the preset images, or import a custom image from a file (e.g. PNG, JPG, etc) via drag-and-drop or by clicking on the icon and using the Open File dialog. Use **ALT-CLICK** to clear/remove the brush image.

**Primary Color** - This sets the color of the resulting brush stroke when using a paint brush. If a Brush Image is loaded and the "Mix Color And Texture", then this color will "tint" the texture.

**Secondary Color** - This sets the color that is used for clearing the background color, etc.

**Swap primary and secondary colors** – Just what you'd expect. It makes the secondary

color the primary one, and vice versa.

**Change Brush Shape** - Same as clicking on the **Brush Shape** icon.

**Reset Brush Shape** - Resets the brush shape back to the default one ( round ). Same as ALT-Click on the Brush Shape icon.

**Change Brush Image** - Same as clicking on the **Brush Image** icon.

**Clear Brush Image** - Removes the brush image. Same as ALT-Click on the Brush Image icon.

### *Brush Image Options*

This section contains options for controlling the Brush Image.

**Tile Brush Image** - Brush Image will be tiled, according to the settings determined in the Brush Tile Setup tool. Most of the Blacksmith3D painting work-flow is designed around keeping this option ON, so only disable it for advanced usage.

**Brush Tile Setup** – Press this button to use the Brush Tile Setup tool, which is equivalent to pressing the SHIFT-V hotkey, or clicking the **Brush Tile Setup** icon in the **Utilities** tab.

**Mix Colors and Textures** - The texture colors will be multiplied by the primary color, resulting in a tinting effect. If the primary color is white, then the texture will be unchanged. If the primary color is black, then the resulting color will always be black. *This is a legacy feature and not recommended. You should use the Color Adjustment Brush to colorize or multiply textures, or use an Image Map Layers to achieve the effect.*

**Flip Texture Horizontally** - Flips the Brush Image horizontally.

**Flip Texture Vertically** - Flips the Brush Image vertically.

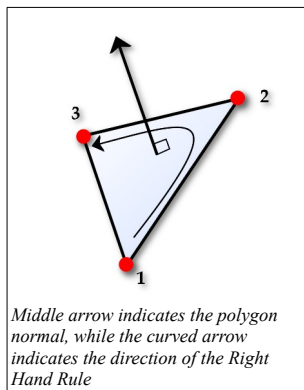
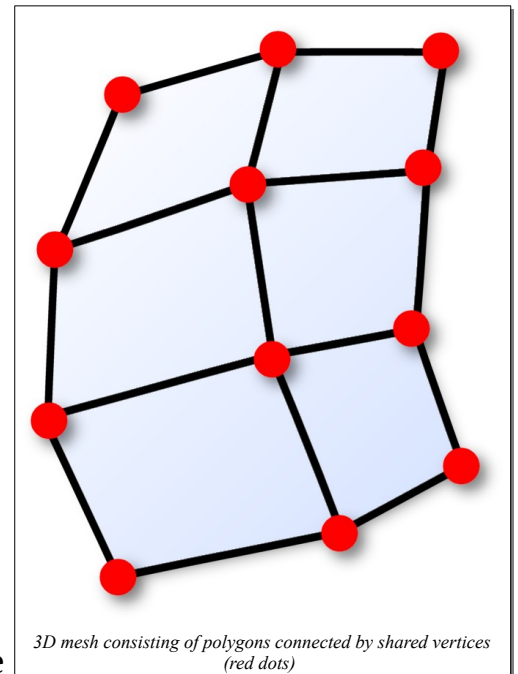
## 7. 3D Graphics Concepts

### 3D Models, UV Mapping and Painting Textures

#### 3D Models

A 3D polygonal model is comprised of two main elements – Vertices and Polygons. Vertices are simply 3D points in space with x, y and z values while polygons are defined by connecting three or more vertices.

A group of polygons sharing a set of vertices form a surface. This is the foundation of all polygonal 3D models; simply a collection of vertices, and polygons joining them together. So, the **polygon** is merely a **logical association between vertices**, so the real size of the shape of the model is determined by the vertices. The polygons merely allow you to **see the surface**.



The vector pointing away from the surface is called a **Surface Normal**, or **Normal** for short. This is a very important property of

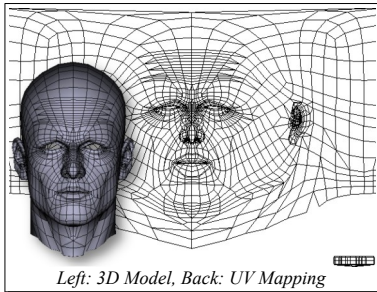
the 3D surface, since it defines the **outward direction** of the surface at any point on the model. This is used for the calculation of **lighting**, but they also has many, many other uses for the 3d graphic artist.

There are two types of Normals that are relevant to the software. Polygon normals and Vertex Normals. Polygon normals are calculated first, using the **Right Hand Rule**. Starting with the first vertex in the polygon, we curl our fingers in the direction of the following vertices. The direction of our thumb dictates the direction of the polygon normal.

The vertex normal is calculated by **averaging the polygon normals** for all of the polygons attached to it, creating a single normal to accompany that vertex. This normal is very important, as it is used any time we need an “outward direction” for a **specific vertex**, such as using displacement maps, using the “bulge” deformer, etc.

## UV Mapping

3D models are, as the name implies, defined in 3 dimensional space (x, y and z). Textures are usually flat 2 dimensional images, although there are also 3D texture maps, and procedural textures which are not currently relevant to this software package.



So the problem is, how do you wrap a 2 dimensional image around a 3D object. Essentially, you have to **unwrap the 3D surface** and **flatten it onto a 2D plane**. That is, for every polygon in 3D space, we need a corresponding polygon in a flattened 2D space. This is called a **UV Mapping**.

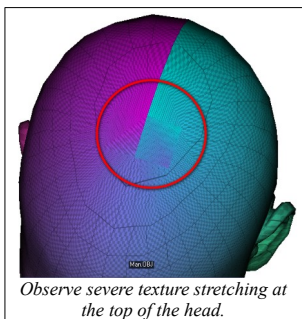
Except for the simplest cases, the UV mapping of a generic 3D model must do a combination of two things to achieve this. One is to introduce UV seams. That is to **cut the UV mapped polygons** in such a way that allows them to be unwrapped. The second is texture stretching. This occurs when the relative shape of the UV mapped polygon differs from that of the 3D polygon, which is a byproduct of the unwrapping. This brings us to the following truism...

**“The more you try to minimize number of UV seams, the more you maximize the texture stretching.”**

Short of using an alternative form of texturing 3D objects (procedural, 3D textures, etc.), this simple fact is unavoidable. This leads us to pose the question... what if UV seams were a non issue? What if you could paint across UV seams and not even notice them? That is the guiding principle behind Blacksmith3D. To make UV seams a non issue so they can occur anywhere on the model and be unnoticeable.

## Painting Textures

OK, now you have a 3D model with a UV mapping. How do you paint a texture on it? The old way of doing it was to paint the texture in a 2D paint application over top a wireframe rendering of the UV mapping. When we say old way, we were being a bit cheeky since this technique is still widely used today.

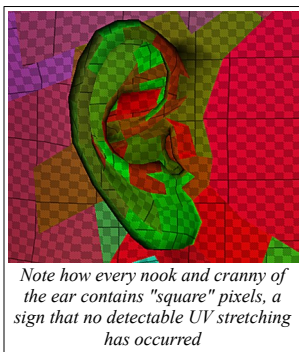


However, we still have to consider the UV seams and texture stretching. It can be extremely difficult to paint a texture across a

UV seam in this way without there being a noticeable discontinuity. This leads 3D artists to attempt to minimize the number of UV seams, and to put them in less conspicuous places. This is not only a very labour intensive process (some tools make it easier), but it also invokes the truism we spoke of before...

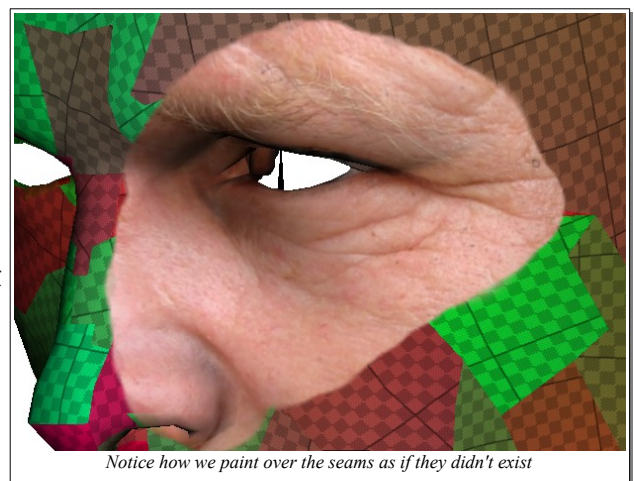
**“The more you try to reduce the number of UV seams, the more you increase the texture stretching.”**

Trying to paint a straight line across a surface that has significant UV stretching can be very difficult indeed. Also, visual artifacts may show up in the texture that can be nearly impossible to remove short of blurring them away.



By doing away with this 2D painting workflow, and introducing a 3D paint application such as Blacksmith3D, you can simply paint directly on the surface of the 3D model, and let the software figure out where to paint the pixels on the 2D image. So if you want to paint across a UV seam, you just paint across it on the surface of the model. If the **UV mapping is good** and the resolution is adequate, the **UV seam are completely undetectable** until zooming in to the sub-pixel level.

While you can still utilize traditional UV mapping techniques to carve out your UVs before painting in Blacksmith3D, you can also skip that step and simply use the “Paint Setup Wizard” to create an **auto-UV mapping**. Since our goal was to enable you – the artist – to paint across UV seams as if they don't exist, then it stood to reason that **seams could appear anywhere on the model, and not be an issue**. As such, the prime goal of the auto UV mapper was to create a UV mapping where every little chunk of the surface was as **flat as possible**, minimizing the texture stretching effects that we spoke about earlier. So in another words...



**“We gave up the fight to minimize UV seams, and simply focused on painting across them as perfectly as possible”,** with the only limitation being the resolution of the texture map.



If you are painting a medium to high resolution texture for video or print, then you should never have to manually UV map a model again. However, if your project provides you with a low limit to texture size (e.g. real time 3D games), then you may still want to manually UV map your models, since the visible pixelization can reveal the UV seams, no matter how perfectly they are painted.

*Just to back up for a moment, let us say that **in principle**, you should never have to manually UV map a model again. However, Blacksmith3D is a texture editor, and not a rendering solution. So, your model and texture will eventually go somewhere else, and **that platform may not be so forgiving with UV seams**. There may also be default settings in that renderer that disrupt UV seams. One to look out for is any sort of **texture blur** setting. Blurring the texture before rendering will definitely make the seams more apparent, so you will want to kill that blur setting ASAP. Likewise, any sort of **texture resizing** may also result in the perfect seams becoming degraded, so watch out.*

## Resources

### Sample Project Files

Here are links to the project files used in the tutorials.

#### Textured-Bunny.blacksmith3d

<http://www.posersoftware.com/blacksmith3d>

#### Textured-Bunny-Multi.blacksmith3d

<http://www.posersoftware.com/blacksmith3d>

#### MorphedMan.Blacksmith3D

<http://www.posersoftware.com/blacksmith3d>

#### MorphedMan-Bad-Symmetry.blacksmith3d

<http://www.posersoftware.com/blacksmith3d>

#### Hair-Example-01.blacksmith3D

<http://www.posersoftware.com/blacksmith3d>



## **Template-Example-01.blacksmith3D**

<http://www.posersoftware.com/blacksmith3d>