

## **Normal Map creation in Mudbox**

**What is a normal map?** A normal map is essentially a variation of the bump map, in which the normals of a 3d object are projected in three directions rather than just one. Typically normals in 3d reflect light perpendicular to the direction of the polygon. The normal map overrides this, creating the appearance of greater differences in the surface. Normal mapping is a rendering effect, and does not affect the geometry of the object.

**Why would you want to create one?** To give the impression of further detail in a max scene, without hampering system resources. This would be particularly important in an animation, or any large scene. The technique is frequently used in computer games.

### **Procedure.**

Typically a low polygon model is created in 3ds max or maya. This should be correctly UV Mapped before export into Mudbox.

Subdivisions are added to the model, to enable higher resolution detail to be sculpted (**Mesh – Add New Subdivision Level or Shift +D**). You will usually need to add three or more subdivision levels to create enough geometry for a fluid sculpt.

Higher resolution detail can then be sculpted into the model using the **Sculpt Tools** in the Bottom tool tray. To orbit around your object use **Alt +LMB**, to pan **Alt+MMB**, and to zoom in and out **Alt+RMB**. This arrangement will be pretty familiar to Maya users.

Once a sculpt brush is selected you can click and drag on the model to sculpt the surface. Brush properties appear in the panel on the left hand side. Brush size can be adjusted with the hotkeys [ + ] as in Photoshop.

If using a wacom tablet, click the advanced rollout at the bottom of this panel to adjust brush sensitivity. Strokes can also be applied with an alpha by selecting one of the presets from the stamp tray in the bottom right of the screen. This is particularly useful when you want to paint a texture like bricks, or tree bark or lizard scales etc. You can bring in your own alphas by clicking the arrow within the circle on the left of these presets and choosing **add stamp**, you'll then get a dialogue asking where the image is.

When you are finished sculpting, make sure your object is selected, by Clicking the **Select/Move Object** Tray, choosing select object and clicking your object (It should change color when selected). Then Click **Maps – Extract Texture Maps – New Operation**. You will get a dialogue asking if you want an ambient occlusion, displacement or normal map. Choose **normal**.

In **Target Models**, you need to specify the basemodel. This will usually be the original model we imported (level 0). Click *Add Selected* to choose this one.

In Source Models click Add **Selected** again, this time you should see the highest subdivision model (e.g. level 4) Specify image size (this should usually be to the power of eight, (e.g. 256, 512, 1024, 2048).

Specify your filename and type and destination. Compatibility can be set to Maya or Max. Finally click **extract** to create your normal map. It may only take a few seconds.

The result will be a vivid blue/magenta/green image. These three colors represent variations to the surface normal. The areas which are unchanged will be colored purple.

To apply the normal map to an object within max. Open the **Material Editor (M)**, select the material which is applied to the object, and in the Maps rollout, click None, next to Bump, making sure it is checked. Choose **Normal/Bump** as the material type. Click the **Normal Map** slot, and choose **bitmap**, which will bring up the dialogue to navigate to your material. You should not see any difference in the viewport, but when you render, you should see the detail which you sculpted.

Max can also create normal maps using the render to texture function (**hotkey 0-zero**), but is incapable of dealing with high resolution meshes, sculpting tools are pretty basic, and alphas cannot be painted with. It will also take you longer to render the texture.

**N/B It would be nice to make use of the ambient occlusion export as well, but for some reason I have had some problems with this on some of the college machines. It seems that feature is not supported by the current graphics cards. Mudbox seems to need a lot more resources than zbrush, and I cannot get it to do much on my laptop without crashing. I've asked some questions about this on the Area forums and have been told to get a better graphics card.**

### **Drybrush Tool in Mudbox**

After you have sculpted high level detail and exported your normal map, you can also make use of Mudbox's paint tools. This may not be an end in itself – you'll probably still want to go into Photoshop and composite together the different elements, but one thing you cannot do in Photoshop is drybrush. The point of this, is that mudbox will let you target higher areas of the mesh and just paint on them. This may be useful for painting sculpted landscapes, tree bark, lizard scales and hair etc. Start by filling your object with a base color – use a large brush. Switch to a flat material to get an accurate reading of your painting. Switch to the **drybrush** and choose

a different color. When you start painting with this, only the highest parts of the mesh will receive the paint, hold ctrl to invert the function and only paint lowest parts of the mesh.