



BODYPAINT 3D

Release 19
Quickstart Manual

MAXON
A NEMETSCHKE COMPANY

BodyPaint 3D R19

Quickstart Manual

The software described in this document is subject to a license agreement and may only be used in accordance with the regulations thereof.

Quickstart writer: Glenn Frey
Layout: Kai Perschke

Copyright © 1989–2017 by MAXON Computer GmbH all rights reserved.

This manual and the accompanying software are copyright protected. No part of this document may be translated, reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of MAXON Computer. Although every precaution has been taken in the preparation of the program and this manual, MAXON Computer assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the program or from the information contained in this manual. This manual, as well as the software described in it, is furnished under license and may be used or copied only in accordance with the terms of such license. The content of this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by MAXON Computer. MAXON Computer assumes no responsibility or liability for any errors or inaccuracies that may appear in this book.

The trademarks [MAXON] (DE 1 139 896, CTM 4639191, IR 950 459; registered in the European Union, the Russian Federation and Australia), [Cinema 4D] (DE 2 068 891, CTM 4959698, IR 664 160, JP 4 385 968, KR 40-2008-0033230; registered in the European Union, Switzerland, the Russian Federation, USA, Japan, South Korea and China), [MAXON FORM] (CTM 4518569; registered in the European Union) and [MoGraph] (CTM 4926771; registered in the European Union) are registered trademarks of MAXON Computer GmbH. In addition, trademark rights can exist for MAXON Computer GmbH or MAXON Computer Inc. in various territories for the aforementioned or other trademarks, e.g. BodyPaint 3D and C.O.F.F.E.E.

Acrobat, the Acrobat logo, PostScript, Acrobat Reader, Photoshop, Flash and Director and Illustrator are trademarks of Adobe Systems Incorporated registered in the U.S. and other countries. Apple, AppleScript, AppleTalk, ColorSync, Mac OS, QuickTime, Macintosh and TrueType are trademarks of Apple Computer, Inc. registered in the U.S. and other countries. QuickTime and the QuickTime logo are trademarks used under license. Microsoft, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. UNIX is a registered trademark only licensed to X/Open Company Ltd. All other brand and product names mentioned in this manual are trademarks or registered trademarks of their respective companies, and are hereby acknowledged. HDRI material preview: Creative Market.

Bullet Time is a registered trademark from Warner Bros. Entertainment, Inc.

The information in this document are subject to change without notice.

BodyPaint 3D R19 Standalone Part 1	1
1. Introduction	1
2. General Information/Interface	2
3. Quick Tutorial: First Painting Lesson	6
4. BodyPaint 3D UV Edit	10
5. BodyPaint 3D Exchange Plugin	19
6. Tips and Tricks	22
BodyPaint 3D R19 Standalone Part 2	24
1. Introduction	24
2. General Information/Standard Layout	24
3. Quick Tutorial: Materials	30
4. Quick Tutorial: Light	36
5. Quick Tutorial: Rendering	42
Sculpting	46

Note:

As a result of continued product development, differences between this and downloadable documentation with regard to referenced files can occur. The most current versions can be found on the product USB stick included in your order, or can be downloaded from the MAXON website or via the Online Updater.

BodyPaint 3D R19 Standalone Part 1

Core functions

In this tutorial we will explain the most important functions in order to give you a running start in the world of “body painting”. Even if BodyPaint 3D appears to be difficult at first, you will soon notice how intuitive BodyPaint 3D really is. In this tutorial we have also put an emphasis on a fast learning curve and a high degree of user friendliness for this. This standalone Quickstart tutorial manual is made up of two parts. Part 1 contains the core functions and Part 2 explains additional functionalities. In this Quickstart manual you will be asked to open certain files for demonstration purposes. These can be found on your Installation USB stick or on the MAXON homepage (www.maxon.net) the support/documentation page.

1. Introduction

To make working with this Quickstart easier, instructional text and tips have been underlain with color for easy recognition.

Instructional text is highlighted in blue.

If you make an error in working through one of the tutorials, these colors will make it easier to locate instructional text and tips when trying to find the location at which you may have made the error.

BodyPaint 3D uses “Dark” as its standard layout. Of course you can select a different layout (main menu: Edit/Preferences/Interface/Scheme), if desired.

BodyPaint 3D will revolutionize the way you work with textures in such a way that you will wonder how you ever got along without it! With this you can paint your models as they are: in 3D. This is what BodyPaint 3D, the revolutionary way to texture objects, is all about. In addition, BodyPaint 3D lets you paint in several texture channels at once and projection Painting is a tool we have integrated that makes it possible to paint on complex objects without distortion.

Using the UV tools you can relax and stretch your UV mesh, no matter how complex it is. Put simply, a UV mesh is a second impression of a polygon mesh that projects the texture onto a polygon object. The days of 2D texturing are over and you can finally concentrate on what’s important in texturing: Creativity. Everything that took up so much time with 2D texturing is now done by BodyPaint 3D and you can deliver your projects faster. Let’s move to the user interface. (BodyPaint 3D is a component of Cinema 4D and can be activated by simply selecting BodyPaint 3D from the Cinema 4D Layout menu at the top right of the GUI.)

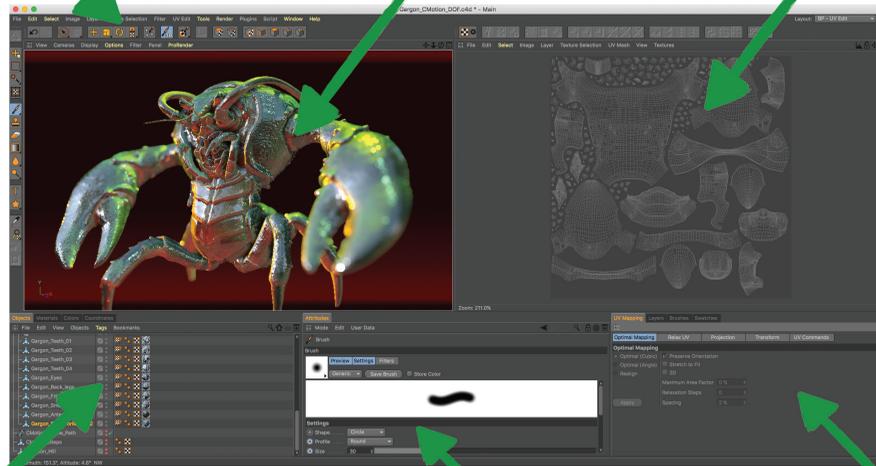
2. General Information/Interface

BodyPaint 3D Standalone offers many functions that will again speed up and improve your workflow. Let's start with the most important step – starting BodyPaint 3D. After starting BodyPaint 3D you will see an image similar to the following screenshot:

6. Icon Palette
(modes)

1. Rendered Viewport

2. Texture Window
(UV Mesh Editor Window)



© model by Chris Korn

5. Object Manager
and color settings

4. Attribute Manager Window

3. UV Manager

Here you see one of the two standard layouts: BP UV Edit. The second layout (BP 3D Paint) is set up in a similar fashion, only without the UV mesh editor window which gives you more room in the editor window to paint.

1. Viewport

Here you can see the object you will be painting. You can rotate, move and zoom the window as needed.

2. Texture Window (UV Mesh Editor Window)

This is where you edit your UV mesh. You can relax and restore your UV mesh. If you use the UV Manager's UV tools you can watch how the texture relaxes. You can also watch the color application process in this window, which will then be visible in the editor window right away.

3. UV Manager

The UV Manager lets you restore the UV mesh using an algorithm. It recognizes layered polygons and attempts to relax the UV mesh for optimal placement over the entire surface and, if necessary, new placement. All remaining "relaxation" can be adjusted manually.

4. Active Tool Window (Attribute Manager)

Different tabs display different brush types and their respective attributes as well as the UV Manager's UV tools.

5. Object Manager and color settings

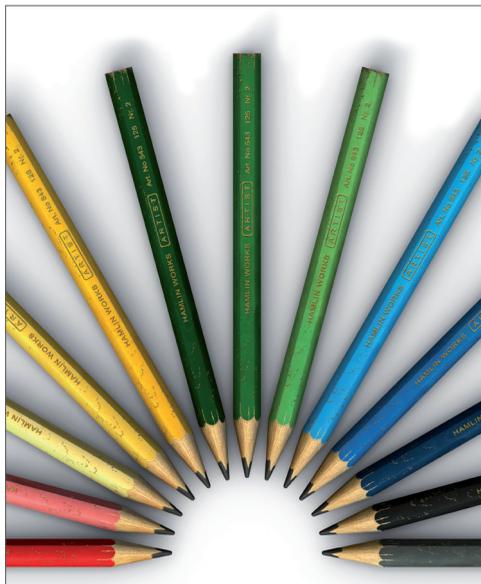
We're sure we don't have to say much about the Object Manager. It's the same manager as in the Cinema 4D main program and lets you select the object to be edited or change its position in the hierarchy. This is the Cinema 4D Material Manager with expanded functionality. This is where you will find your textures with their respective layers. If needed, you can paint in several layers at once (for example color and relief channels). To do this simply select the texture to be painted and the respective layer and start painting.

6. Icon Palette

The command palette contains the Paint Setup Wizard, the Projection Painting and many other tools (that you are probably used to using with 2D paint programs). The Paint Setup Wizard eliminates the need to manually create a texture including the UV mesh. It also calculates the texture size and channels. Without these bothersome preparations you can begin painting right away.



© Joe Yan – dr_heyjoe@hotmail.com



© Anders Kjellberg – www.dogday-design.com

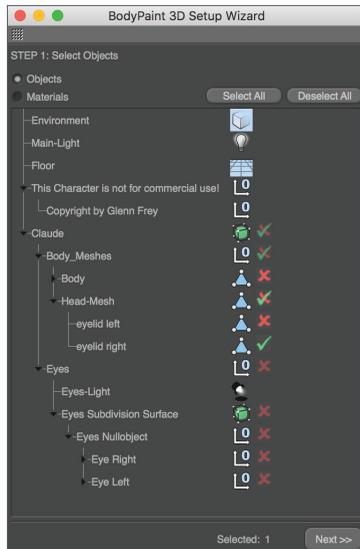


© Peter Bucholz

Now we'll get to the heart of this tutorial. Open the file QS_BP3D_01.c4d. Say hello to Claude, our guinea pig for the day. In the course of this tutorial we will alter the color of his right eyelid a little and apply a bump layer in elephant-look to his skin. Select the predefined standard layout BP UV Edit at the top right and to the left of BodyPaint 3D's main editor window. Click on the Paint Setup Wizard Icon so we can make the necessary preparations to the texture (brush icon with white stars).



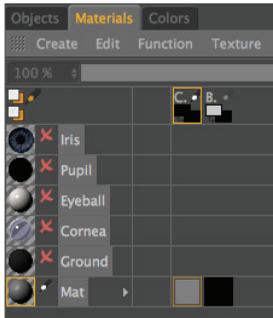
Click on Deselect All in the window you just opened and apply a green check mark to the "eyelid right" object only.



We have just determined that a texture should be created only for the right eyelid object. Click on Next. Leave the settings in the next window the way they are. The selection Single Material Mode would create a texture for each object individually. If the box is not checked all objects will share one texture surface. Click on Next again. In the next window check the bump channel. The color channel is selected by default. You can double click the little gray boxes next to each texture channel and assign each channel a base color. Since Claude likes elephant gray we will leave the boxes the way they are. Leave the rest of the settings the way they are and click on Finish, then on Close in the next window. The basic textures have been created and we can start painting. If you have experience with earlier texturing methods and the time it took to even get started BodyPaint 3D will seem like a blessing to you. BodyPaint 3D saves you a lot of time. Now let's move to the second part of the tutorial: the UV meshes and the first brush stroke.

3. Quick Tutorial: First Painting Lesson

At the bottom left of the Material Manager (in the Materials tab) you will find the texture we just created, right next to Mat.

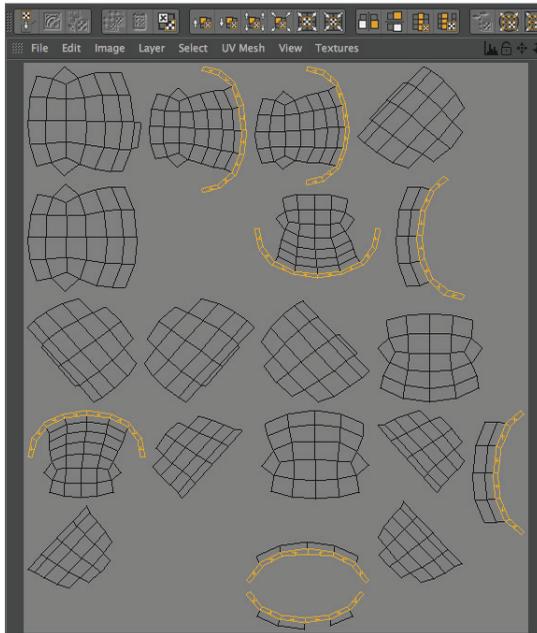


This is the default name for a new texture. Of course you can rename the texture if you like. The first material is the color layer and the second is the bump layer (at the top of the window you will see the abbreviations which refer to these layers – C for color and B for bump).

Now Select the Use UV Polygon Edit Tool symbol.

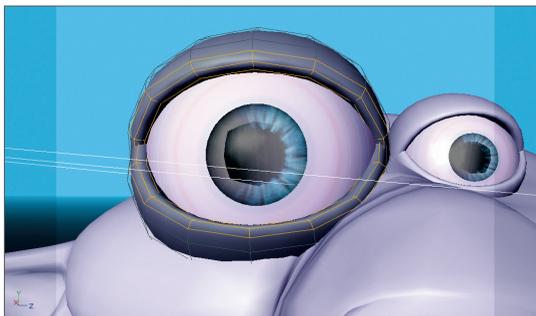


Once you have selected the corresponding texture in the color channel the UV mesh should become visible in the texture window at the upper right. If the mesh is not visible, activate it by clicking on UV Mesh/Show UV Mesh in the texture window menu. Luck is on our side! The UV mesh looks good. The only thing that bothers us is the fact that the edges of the eyelids are too small (highlighted in orange in the next image!).

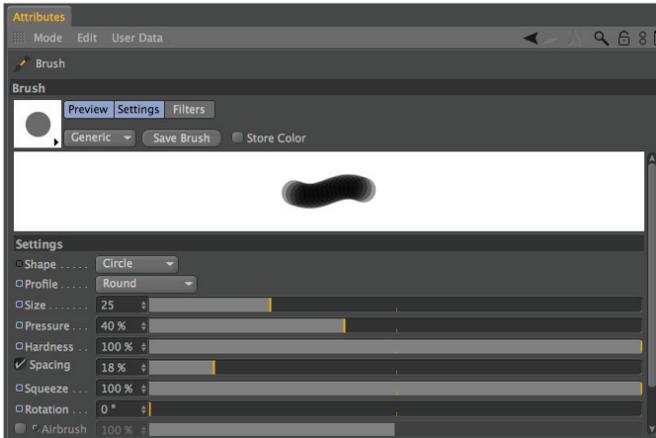


The individual UV mesh polygons of these eyelid edges take up less texture area than the rest of the polygons. That's why a texture placed into the bump channel appears larger in these places (photograph of elephant skin, for example). We can do without this, though, since we are painting our own skin structures onto the surfaces and not using an existing texture. We can counter any distortion we encounter when painting manually by using Projection Painting. The stroke will maintain its width no matter how the polygon is spread over the mesh.

Move and zoom the editor window view until Claud's right eyelid fills the view.



Now select Brush Tool for Painting Textures for applying the color. Set the size to 25 and the hardness to 40 in the brush's Attributes Manager.

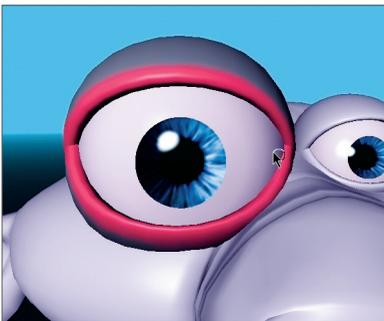


...and select a pink color using the Preview Active Channel directly below. If necessary, increase the Subdivision Surface level for the editor because the original eyelid polygon object is very lowpoly and edged.

Now activate Projection Painting ...



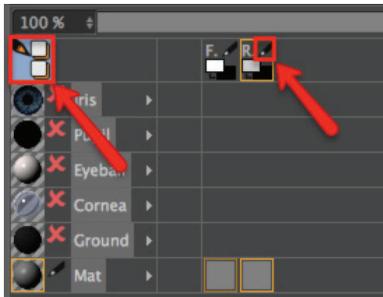
... (You already know what this function does) and start painting. Of course BodyPaint 3D supports the use of graphic tablets such as a WACOM Intuos. Painting objects with a pressure sensitive pen on a graphic tablet is much easier than painting with a mouse. Paint along the edge of the eyelid. The eyelid will probably end up looking like this:



If you move/rotate the figure now or click on the Apply Projection (click and hold on the Activate/Deactivate Projection Painting button)



you will see how the color was applied to the texture (you can see the recently applied strokes of color in the window to the right).



You can take the same steps for the bump layer. We will take you one step further, though, in order to be able to explain an important function. We will paint both eyelids at the same time! Select the texture in the color channel of the Material Manager. Now click on the icon with the black/orange pencil at the left of the Material Manager. A light blue background tells you the multi-brush mode is active. Select the pencil icon next to the B of the bump channel as well.

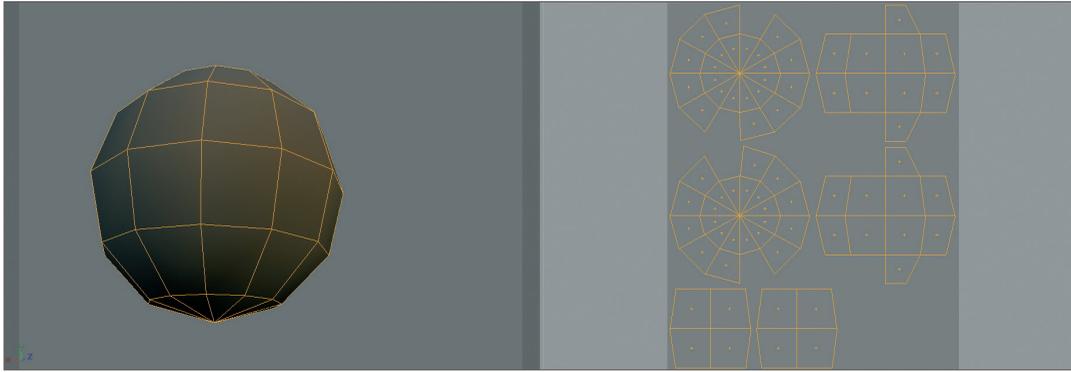
Rotate the view so you can see the eyelid from the top. Set the brush size to 10. Switch to the color layer's Color menu and set the color to a medium gray which will be the base color for our eyelid. Now go to the bump layer's color preview and set the color to black (both color layers are located in the Materials tab under the letters C and B + pencil symbol). When you paint on the object you will notice that both colors are being applied to the object – the gray base color and the black (to indicate indentations). (If white were the color of the Bump channel it would "raise" the brush stroke instead of indicating indentations). The result could look like the following image.



Load the QS_BP3D_01_Final.c4d file and take a look at it when you have time.

4. BodyPaint 3D UV Edit

In this chapter we will show you more about editing UVs. First, though, you need to know what UVs are before getting started. Take a look at the following screenshot:

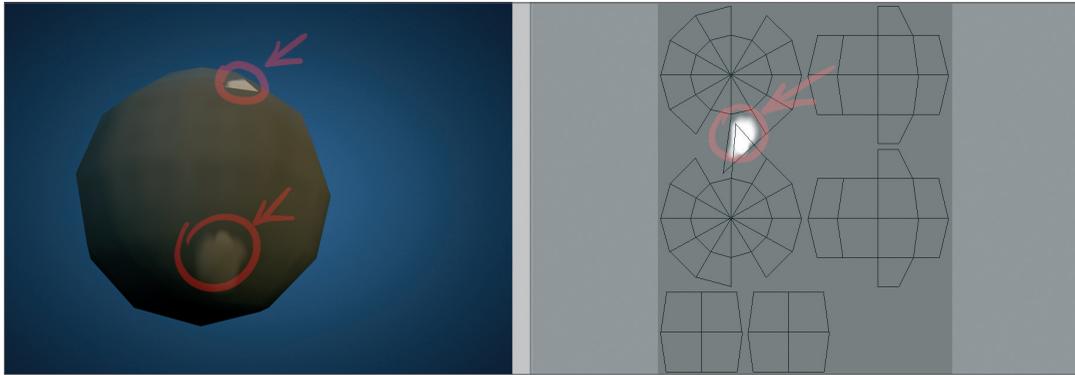


The polygons of the sphere at the left are outlined in orange. Now imagine the sphere has a second invisible skin lying over the polygon mesh. We will cut this skin open at selected locations and press it flat onto a surface. This is our UV mesh (at right). This UV mesh is nothing more than a copy of our polygons in a flat state. The UV mesh can be edited independently of the polygon mesh without affecting the polygons' geometry and vice-versa.

Each individual polygon has a UV counterpart with which it is linked, however each can be edited independently of the other. This only applies to the shape of our polygons with regard to UVs and not, for example, to the coloring. If part of a texture on which a UV lies is painted, the polygon linked to that UV will automatically receive the same color. Hence, the mesh on the right can be painted and the result can be seen immediately. Inversely, the sphere on the left can be painted and the result can be seen on the mesh to the right as the painting occurs. Hopefully the basic function of UVs is now clear to you. Now you may be wondering how UVs are edited and, more importantly, why.

We have created another screenshot (below) in order to better demonstrate this. What you should know first, though, is that UV meshes aren't always as neat and clean as the one used above, especially when working with complex objects. The UV polygons of complex objects can often overlap when opened and flattened (BodyPaint 3D does this for you automatically). Individual UV polygons can also be scaled oddly. Make sure UV polygons do not overlap, causing them to share textures. If, for example, a hot pink were used to paint the lips of a character and the UV polygons belonging to the lips overlapped with a few of the polygons belonging to the side of the character's neck, the hot pink color would be applied to these UV polygons as well. Unless you're designing an alien politician who talks out of the side of his neck this would probably be an unwanted effect.

Now for our screenshot to clear things up:

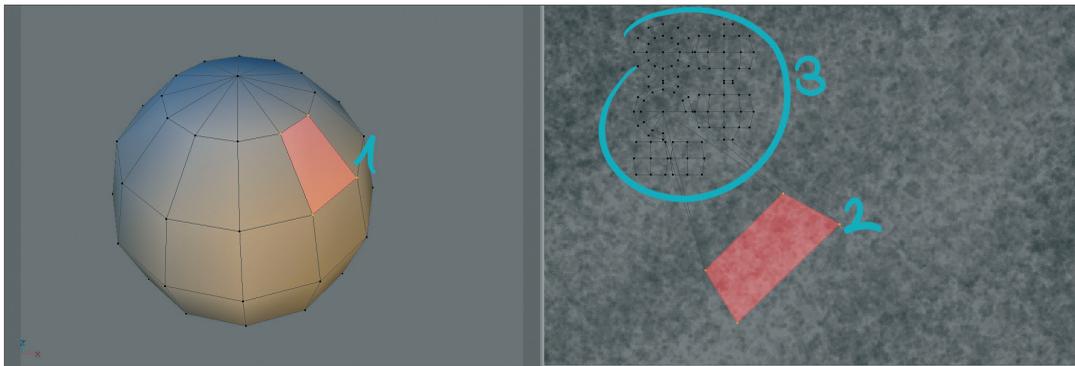


At the right you can see the UV mesh with the underlying texture. We have added a white spot to the texture. If you look closely you will see that two UV polygons overlap. This means that they share the same area of the texture in the area in which they overlap. This result in the white spot being displayed twice on our sphere (left). This can be quickly remedied by manually moving the UV polygons or points or by applying BodyPaint 3D's Relax UV function. More on that later, though.

Once the UV polygons no longer overlap the next issue to avoid arises:

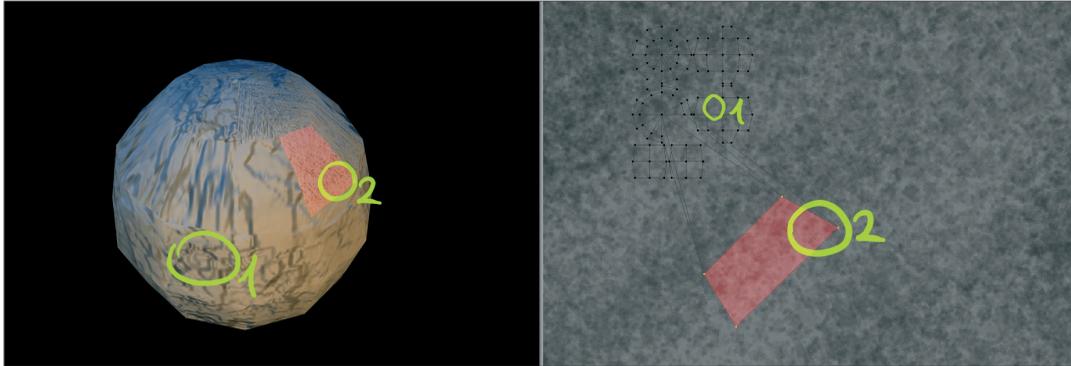
If, for example, a noise bump texture is used that should appear uniformly on a given object, the UV polygons should have more or less the same size. If a few UV polygons are much larger than the rest, the noise bump texture would appear much finer on those larger surfaces.

Of course we have created corresponding screenshots to demonstrate this effect.



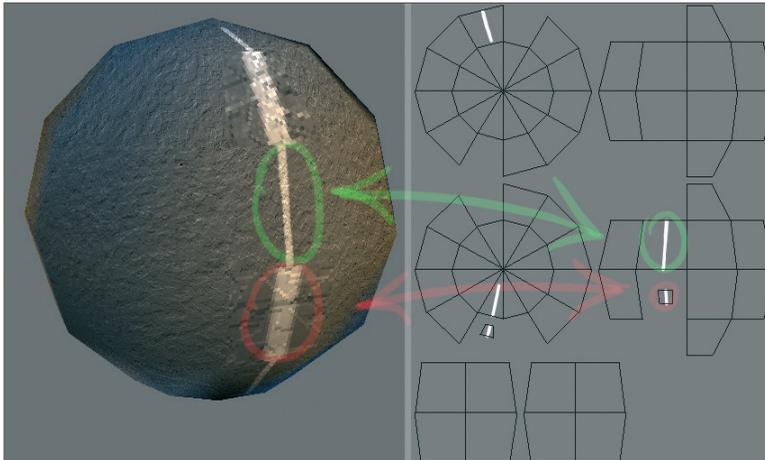
We have highlighted a polygon (red) on the sphere at left. At right you can see the corresponding UV polygon, also highlighted in red. In order to clearly demonstrate what happens when a particular polygon is much larger than the rest, we have greatly reduced the size of the surrounding UV polygons. Take a close look at the right side of the UV mesh. The highlighted UV polygon takes up much more space than the surrounding UV polygons. However the size of the corresponding polygons remains the same. Accordingly, the texture's noise will be squeezed onto the size of the respective polygon when rendered, resulting in a finer noise texture.

This can be seen clearly in the following screenshot:



Caption: The circled areas of our UV mesh on the right and the corresponding areas on the sphere (left).

The texture in area 1 is much more coarse than the texture in area 2. This is because the UV polygon of area 2 is much larger, causing the bump to be displayed much finer. A further example of the effect large UV polygons have when applying color:



In the scene above we scaled down two UV polygons and subsequently drew a white line on our sphere from top to bottom. You can see how the line width varies depending on the size of the UV polygons. The impression is made that two different line strengths were used when painting, even though only a single line was drawn. So what should you do if you paint your artistic stripe onto the sphere with a constantly varying brush strength and the UV polygons also vary in size?

Answer: Use the newly integrated Projection Painting tool. You will find the icon in the Command Palette.

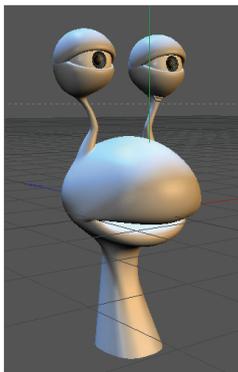


This intelligent little tool keeps the brush thickness from being varied and makes sure that the line is applied equally onto the object. The artistic stripe you painted will be varied in width only on the texture under the UVs. The line in the next screenshot was painted using Projection Painting. Take a look at the different line strengths on the UV mesh at the right. At those locations where the UVs are small the line width will be narrower as well.

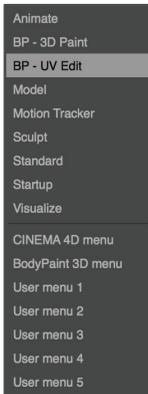


It is very important that you understand this basic concept when working with BodyPaint 3D in order to achieve optimal results.

In the following we will take a closer look at the UV tools. [Open the file QS_BP3D_02.c4d](#). This file contains a snail's head whose UV polygons we will prepare for painting.



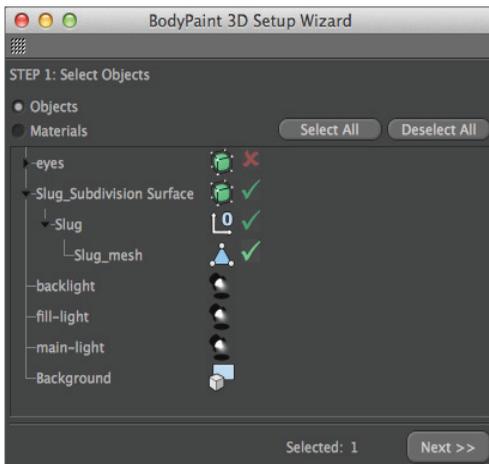
Start by switching to the default layout BP UV Edit at the top left right of your interface.



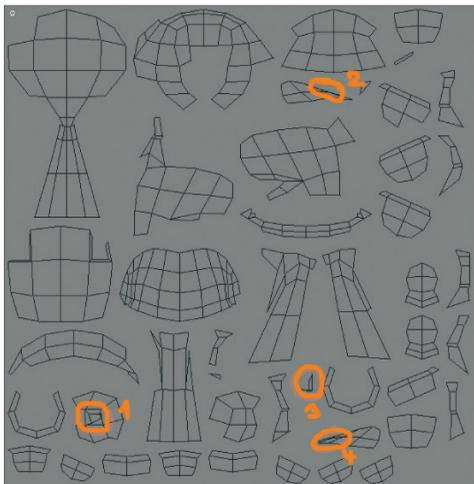
We have just switched to BodyPaint 3D's UV edit interface. The functions contained in this layout are specifically designed for the editing of UVs. Next we will create a material with the corresponding UV polygons. To do so click on the Paint Setup Wizard tool, located in the Command Palette above.



In the window that appears, click on the top green check mark and subsequently click on the Next button twice, once on Finish and once on Close.

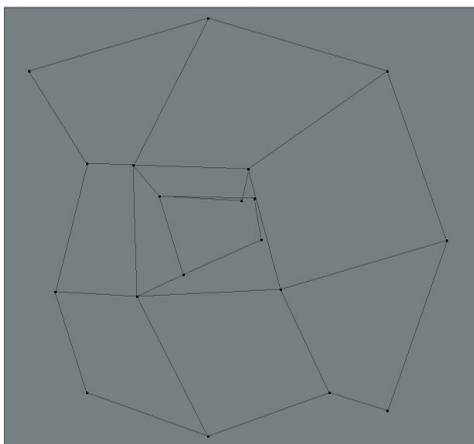


We have just created a texture for the Color channel. At the right you should now be able to see our UV polygons. If not, activate the Show UV Mesh option in the menu from that window's UV Mesh menu.



The Paint Setup Wizard saves us from having to manually peel the UV skin off of our character and has flattened it neatly onto our texture. Our mesh looks quite good at first glance. However, if you look closely, a few spots can be found that need working on, which we have circled for you in orange. Areas 1 and 2 have overlapping and the polygons in areas 3 and 4 are too small. First, zoom in to area 1.

Attention: The look of the UVs can be different because of optimization of the mapping algorithm so UV issues can be at different positions than shown in this screenshot. If this is the case, simply zoom in and find overlapping UV islands for yourself. This has no influence in this tutorial because the workflow stays the same.



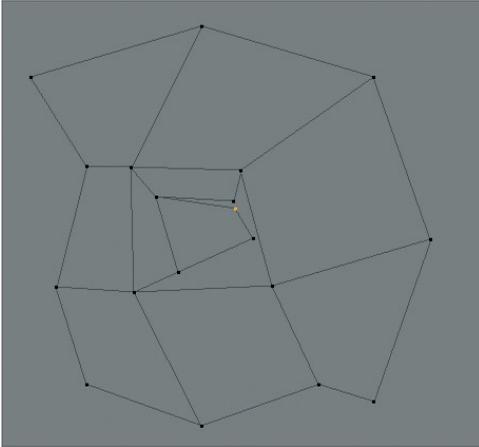
As you can see, two UV polygons overlap in the center. In order to correct this, first activate the Use UV Point Edit tool...



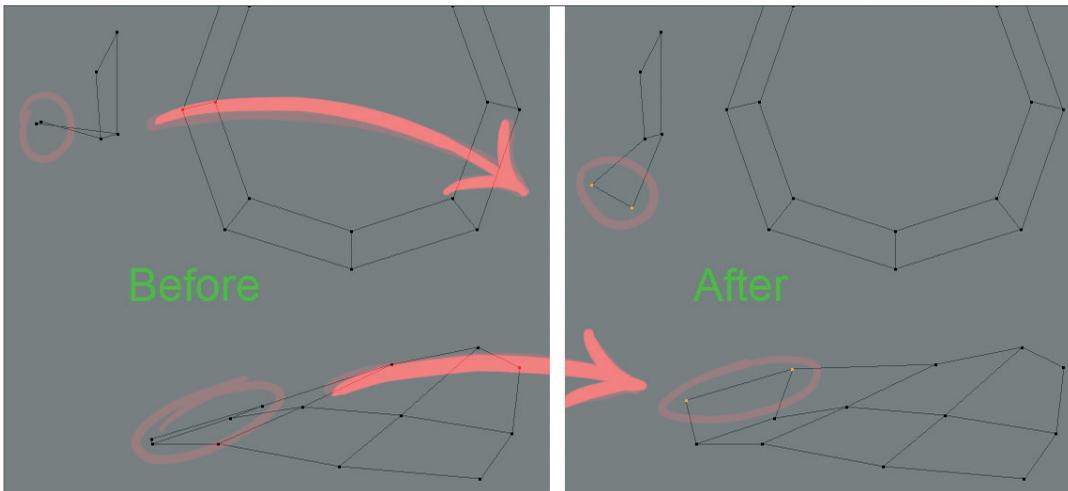
...then activate the Move tool...



...and rearrange the corresponding points until the UV polygons no longer overlap.



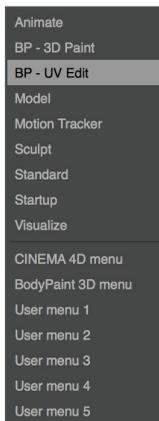
The remaining areas (2-4) can also be corrected using this method. Refer to the following screenshots if you need help:



Once all problem areas have been corrected the mesh can be painted. The method we just described was the manual method of fixing such problem areas. However, BodyPaint 3D also offers tools that will automatically “relax” complex UV polygons and we will turn our attention to these tools now. Open the file QS_BP3D_03.c4d. The geometry in the area of the monkey’s missing nose is perfect for our demonstration (note that no animals were hurt in making this tutorial. All animals are trained virtual professionals!).



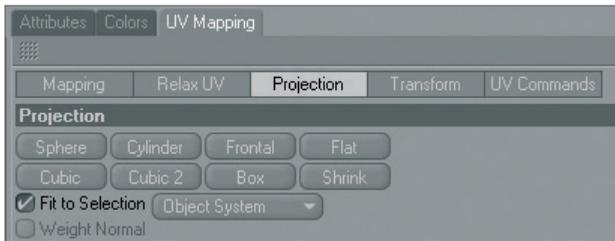
If not already there, switch to the BP UV Edit layout.



Start the Paint Setup Wizard...

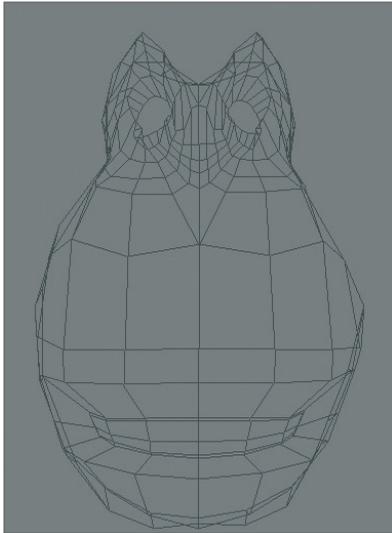


...and click twice on Next, once on Finish and finally on Close. As in our first example, you will see the UV mesh appear in a window at the right of your interface. Select the Use UV Polygon Edit tool from the Command Palette at the top and open the UV Mapping tab in the UV Manager at the bottom right of your interface. Once in the UV Mapping tab, go to the Projection page.

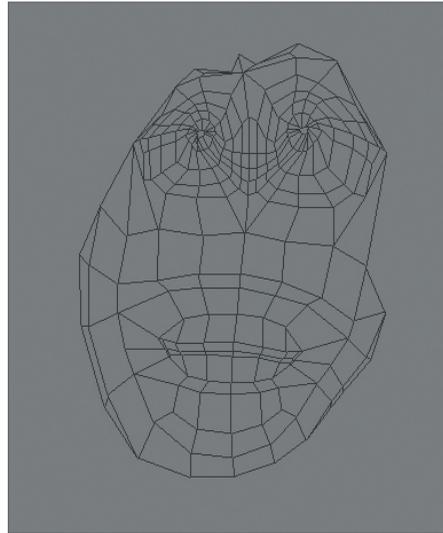


Set Projection to Frontal. Now select other types of projection by clicking on the corresponding button to see the different types of projections that are available. Once you've taken a look at them all, switch back to Frontal mode. Frontal mode reflects the active editor view. This is also why we have chosen this mode for our monkey's face.

As you can see, the UV polygons in the area of the monkey's nose are overlapping. We will now use the BodyPaint 3D Relax UV tool to take care of this little problem. Open the Relax UV page in the UV Manager's UV Mapping tab. On this page you will see an Apply button. Make sure to deactivate the Pin Border Points and Pin To Neighbors options and click on Apply. The UV mesh will be markedly relaxed.



Left: Before applying Relax UV.



Right: After applying Relax UV.

Each UV polygon now lies next to another and no UV polygons overlap. Doing this manually would have practically been impossible and may even have led to a few nervous breakdowns among our readers. That's it, our UV mesh is now ready to be painted. As you can see, just a few steps are required and you can turn your attention to the creative part of your work – painting your object's UV mesh.

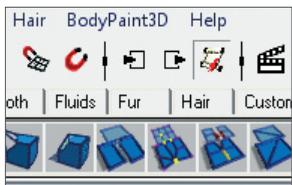
5. BodyPaint 3D Exchange Plugin

Before we get started we want to pass on some important fundamentals to you.

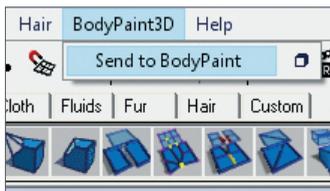
By default, BodyPaint 3D saves images in .tiff format, which can also contain layers. When these images are subsequently loaded and re-saved in foreign applications, these layers may be lost. If you use Photoshop for editing your images you can also set your BodyPaint 3D default image format to .psd (Photoshop).

The files BodyPaint 3D requires to communicate with foreign applications (e.g. Maya, 3ds Max, XSI or LightWave 3D) can be found in the BodyPaint 3D program folder under "Exchange Plugins". Make sure you copy all necessary files for the applicable software to the corresponding directory. If using Maya the files must be loaded and executed in the following order using the Script Manager: BodyPaintExchangeLoadPlugin.mel; BodyPaintExchangeUI.mel; user-setup.mel. (refer to your BodyPaint 3D reference manual for additional information).

For Maya, the object exchange, including textures, is done using the corresponding menu command.



(Please refer to the BodyPaint 3D reference documentation (Main menu/Help) for information regarding the location of the corresponding BodyPaint 3D exchange plugin for your software). Exchanging objects is very easy. Take an object, send it to BodyPaint 3D using the Send to BodyPaint command (BodyPaint 3D will be started automatically), paint your object in BodyPaint 3D and send it back to your application using the Send Scene Back command.



Geometry-, material-, light-, UV- and any available texture data will be exchanged. Your BodyPaint 3D reference manual provides more information regarding the preparation of files for use with exchange plugins. The following information applies to use with Maya:

MAC

[Maya 5]

Macintosh HD / Applications / Alias Wavefront / maya 5.0 / maya

- Right-click on the Maya executable file and select Show Package Contents. The path will be the following: Contents / MacOSClassic / plug-ins.
- The scripts belong here: Macintosh HD / Users / Shared / Alias / maya / scripts.

[Maya 6]

Macintosh HD / Applications / Alias / maya 6.0 / maya

- Right-click on the Maya executable file and select Show Package Contents. The path will be the following: Contents / MacOS / plug-ins.
- The scripts belong here: Macintosh HD / Users / Shared / Alias / maya / scripts.

[Maya 6.5]

Macintosh HD / Applications / Alias / maya 6.5 / maya

- Right-click on the Maya executable file and select Show Package Contents. The path will be the following: Contents / MacOS / plug-ins.
- The scripts belong here: Macintosh HD / Users / Shared / Alias / maya / scripts.

[Maya 7]

Macintosh HD / Applications / Alias / maya 7.0 / maya

- Right-click on the Maya executable file and select Show Package Contents. The path will be the following: Contents / MacOS / plug-ins.
- The scripts belong here: Macintosh HD / Users / Shared / Alias / maya / scripts.

PC

[Maya 5]

- Plugin: C: \ Programs \ AliasWavefront \ Maya5.0 \ bin \ plugins
- Scripts: C: \ Documents and Settings \ username \ My Documents \ maya \ 5.0 \ scripts.

[Maya 6]

- Plugin: C: \ Programs \ Alias \ Maya6.0 \ bin \ plugins
- Scripts: C: \ Documents and Settings \ username \ My Documents \ maya \ 6.0 \ scripts

[Maya 6.5]

- Plugin: C: \ Programs \ Alias \ Maya6.5 \ bin \ plugins
- Scripts: C: \ Documents and Settings \ username \ My Documents \ maya \ 6.5 \ scripts

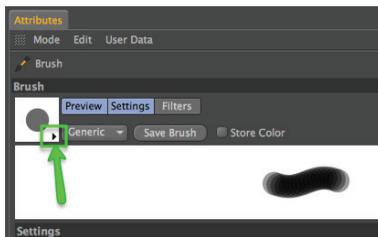
[Maya 7]

- Plugin: C: \ Programs \ Alias \ Maya7.0 \ bin \ plugins
- Scripts: C: \ Documents and Settings \ username \ My Documents \ maya \ 7.0 \ scripts

In contrast to MacOS, Maya scripts must be installed for each user separately in Windows.

6. Tips and Tricks

- A very helpful function can be found in BodyPaint 3D's preferences (Ctrl+E). In the BodyPaint menu you will find the function Project On Invisible Parts. Which, when activated, can make your work a lot easier. Let's assume you want to color the arm of a figure or sprinkle color on the entire figure. You would have to apply the color with this function deactivated, rotate the arm, apply the color, rotate the arm and, well, you get the idea. When this function is activated you apply the color in the front view and the color is applied to all surfaces lying behind this surface at the same time. Just make sure you don't apply color to objects you don't want to color when this function has been activated.
- If a texture map does not fit correctly at the point where large and small polygons meet (in the case of low-poly objects that are subordinates of Subdivision Surface) set the Tile UVs function, in the respective Subdivision Surface Object's Attributes Manager, from User to Border or Edge. This sends the UV mesh through the Subdivision Surface algorithm and subdivides it to fit the polygon object. Make sure the Subdivision Surface type is set to Catmull-Clark (without N-Gons). Otherwise this function will be disabled.
- Avoid UV polygons that meet to a point when applying a noise texture to a bump layer. The narrower a 3-sided polygon becomes, the coarser the bump noise channel will be rendered. Of course such a polygon has much less area for the noise structure at its tip than it does at its center which results in a magnification effect of the noise structure. Try to set up each side of a triangulated polygon as an isosceles. This also goes for "4-point polygons" when they converge into a trapezoid. The more square the polygon the more even the structure will be.
- It goes without saying that you need different brushes for different texture looks. BodyPaint 3D has a wide variety of brush types for you to use. Just select the brush Tool and click on the small black arrow on the brush preview.



- Here you will find all the brushes your heart desires. If you don't find the brush you're looking for we've beat Murphy to the punch and have given you the possibility to create and save your own brushes. Just make the changes you want and click on the Add Preset Save Brush button.
- With this tutorial you have gotten to know how BodyPaint 3D works and you can convince yourself of the advantages painting directly onto objects themselves offers. With only a little practice you can also achieve similar results as you can see on the next image – Claude's new texture outfit.



Here the same rule applies for best results: Try it, don't just study it!

BodyPaint 3D R19 Standalone Part 2

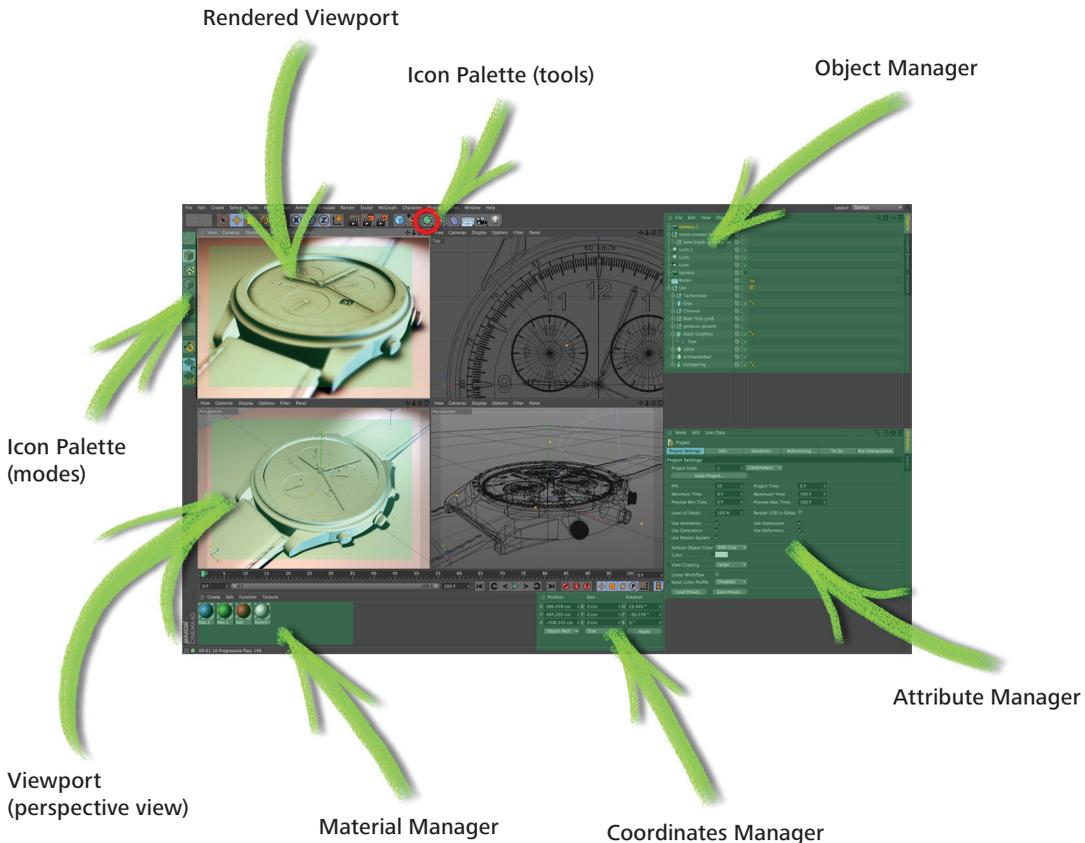
Additional functions

1. Introduction

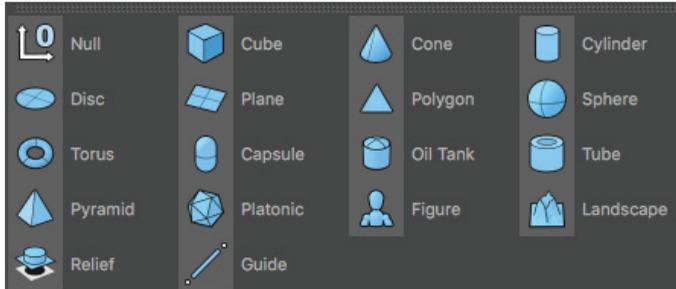
The purchase of BodyPaint 3D R19 Standalone lets you do more than just paint objects. With it you can also model, texture, animate and set lights. We will explain a few of these core functionalities in the following tutorials.

No matter if you work in the field of print, advertising, design, visualization or film, BodyPaint 3D gives you all the tools you need to make your ideas reality. In order to give you an impression of what to expect from the interface we'll go straight to Part 2 of the BodyPaint 3D standalone Quickstart tutorial – the standard layout.

2. General Information/Standard Layout



The primitives are located in the Primitives command group. It contains all of BodyPaint 3D's available predefined parametric objects.

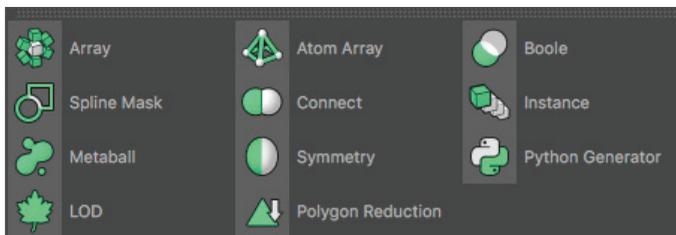


One click and the world's most used object is created – the cube. Click and hold to see all available parametric objects. This is where you choose the initial shape you will need. And don't forget that only parametric objects that have been converted to polygon objects can be edited at a polygon, point or edges level!

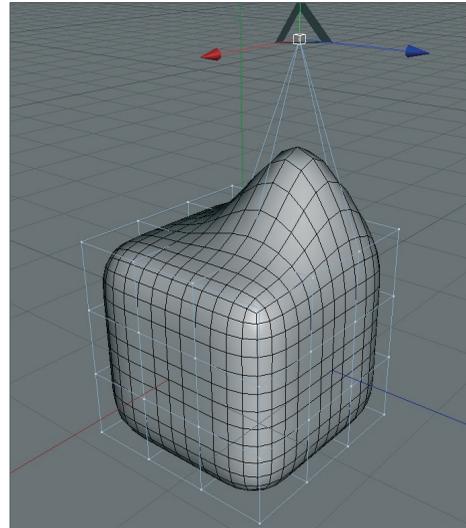
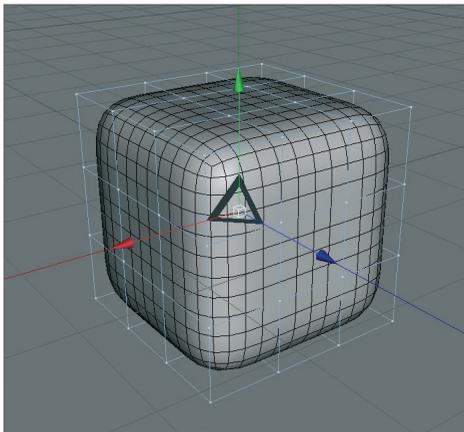


Note: After an object has been initially created it is basically a parametric object. A parametric object can only be modified as a whole and not its individual surfaces (an exception are special deformer from the Deformer menu). Before you begin modeling, the parametric object must be converted to a polygonal object. To do so, select the object you want to convert and run the Make Editable command by pressing the c-key on your keyboard. You can now move or modify individual points and surfaces. Two symbols to the right of the Cube Primitive symbol (black cage with white points and turquoise inner) are the Generators. The most important of these is the Subdivision Surface object.

The next group icon hosts probably the most important BodyPaint 3D object, the Subdivision Surface object.



If a polygon object is a Child object of a Subdivision Surface object its polygon wireframe (mesh) will be subdivided to a higher degree. If an object is made a Child of a Subdivision Surface object its subdivisions will be increased virtually, which will give the object a softer look. As you can see in the next screen shot: The outer mesh (light blue) shows the polygon cube's actual subdivision. The finer inner mesh (blue) shows the subdivision of the Subdivision Surface object. Change the cubes' display mode by selecting (deactivating) Options/Isolines in the Viewport's menu and switching to Gouraud Shading (Lines) in the Editor's Display menu. In the end it's up to you how you want your objects displayed in the same menu. Then switch to the Use Polygon Mode in the left Icon Palette. However, for this tutorial, this is the most effective way to show the effect Subdivision Surface objects have on polygonal objects or primitives since it shows how the cubes are subdivided and the final result is therefore also easier to visualize.



The advantages, especially in modeling, are obvious. Since the object contains few points (edges / polygons) that can be edited it remains very manageable. You can drag just one point of the original wireframe and the Subdivision Surface mesh, with its finer subdivision, will follow the virtual point being dragged (see next screenshot).

If the polygon object were made up of such fine subdivision modeling, it would be much more complicated. You would pull one point and only one point would be moved. All other surrounding points would retain their position. You would have to move each one individually in order to achieve the desired shape.



© Bill Ledger – ToyBox Animation



© Kevin Capizzi



© Anders Kjellberg – www.dogday-design.com



© Anders Kjellberg – www.dogday-design.com

3. Quick Tutorial: Materials

A well-modeled object can make a mediocre impression if the right textures aren't used. Textures give a model color, highlights, structure and other important surface properties. A texture placed into the bump channel, for example, gives the object's surface an uneven, bumpy look without actually altering the geometric structure. This effect can be used to imitate skin wrinkles, scars or the surface of an orange. The displacement channel works in a similar fashion, only that it actually does change an object's geometric structure. In short: Textures have the same significance as the outer shape of an object because they are necessary for achieving the desired atmosphere, coloring and surface structure.

We will begin with a brief introduction to the individual material channels:

Color: This is where the material's color or the base color for the texture is set.

Diffusion: This channel makes your texture irregular. Through the application of a shader or a texture your object receives a dirty or dusty look. If desired it can also influence the Reflectance and Luminance channels, respectively, and the specular highlight.

Luminance: The material is given an illuminative property which is also taken into account in the Global Illumination calculation.

Transparency: This is where you determine the material's transparency.

Reflectance: Gives the material reflective characteristics and defines the material's highlights and highlight colors.

Environment: A texture is used to simulate an environment reflection.

Fog: This channel lets you apply a fog property to a material.

Bump: Uses an optical trick to translate light and dark elements of a texture or a shader to simulate the height and depth of an uneven surface. Scars, wrinkles or scratches can be simulated using this channel. If you activate the „Parallax Offset“ function the result will be even more realistic. A real displacement in the Displacement Channel will of course be the best way for this but the Parallax solution is very close to it and has way less render times.

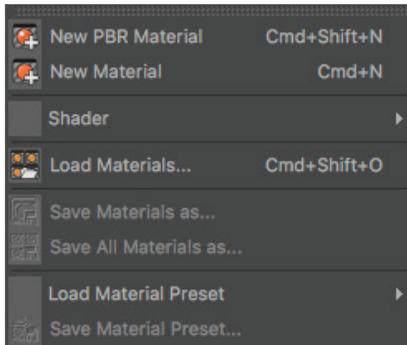
Normal: This channel is meant for use with normal textures. Normals give a low-res polygon object a hi-res look when RGB textures containing the required properties are applied. This lets a hi-res polygon object be replaced by a low-res object, thus saving a lot of render time and offering the same visual result.

Alpha: A texture's transparency is determined by a material's light and dark areas. Black equals a transparency of 100% and white makes it opaque.

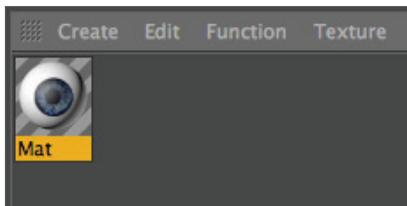
Glow: Gives the object a self-emitting glow.

Displacement: Deforms an object using light and dark values (calculates differences in height). Do not confuse this with the Bump channel which only imitates an uneven surface.

We will now create our own material. Open the QS_Material.c4d file. You can see in the Object Manager to the right that the object does not yet have a texture applied to it. Click on file/new material in the Material Manager at the lower left.



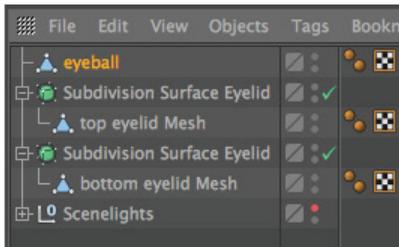
A standard material has been created. If you click on this material its properties will be made visible in the Attributes Manager to the right. In the Basic menu you can determine which channels should be activated for this material. Go ahead and activate the Bump channel. As soon as you have done that a new menu button, Bump will appear. Now click on the menu button Color and load a texture into the material by clicking on the small arrow next to Texture. Choose Load Image and load Iristexture.jpg. In the mini-preview of the Material Manager at the lower left of your screen you will see the texture displayed as soon as it has been loaded. This gives you a good overview of the materials being used in the scene.



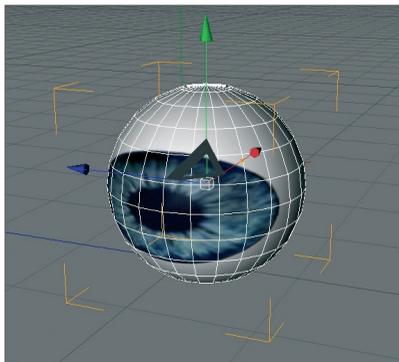
Repeat this procedure for the Bump channel and load Iristexture_bump.jpg into the channel. This JPEG contains the gray scale version of the iris texture which we need to create a relief effect for the surface. You can also choose Filter (click on the small light gray arrow next to the word Texture in the Bump channel) and load the color texture here and set its saturation to 100%. This saves you from having to load a second image. The bright areas of the image will later appear to be raised on the object and the dark areas of the image will appear to be somewhat indented. A true deformation of the object will only take place in the Displacement channel. The Bump channel does not alter the polygon's surface but uses an optical illusion to give the surface its structure.

Click on the material in the Material Manager with the left mouse button and drag it onto the object eyeball in the Object Manager. (When you drag the material over the object you can let go once the little white arrow points down). Alternatively you can drag the material onto the desired object (the eyeball) directly in the Editor. Just make sure you drop the material onto the correct object if there are several in the scene or in close proximity to one another. You can check in the Object Manager to make sure the material was dropped onto the correct object – the material icon will appear next to the object onto which it was dragged.

You have probably noticed that the eyeball brightened somewhat after you applied the material but you aren't able to see the actual texture. We still have to change the offset properties and the mapping size so the texture will be aligned properly on our object. At the moment the actual image of the iris is lying distorted on the right side of the eyeball. You can check this by making both Subdivision Surface eyelid objects invisible for the editor. To do this double-click on the top small gray dot to the right of the object in the Object Manager (until it turns red).



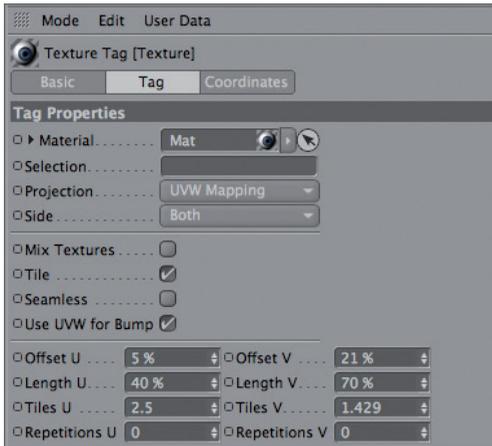
Double-click on the dot again and it will turn green, which makes the objects visible again independent of the visibility settings of any parent object. The dot directly below has the same function except that it affects the rendering. Once you have made the eyelids invisible and have rotated the view a little the eyeball should look as follows:



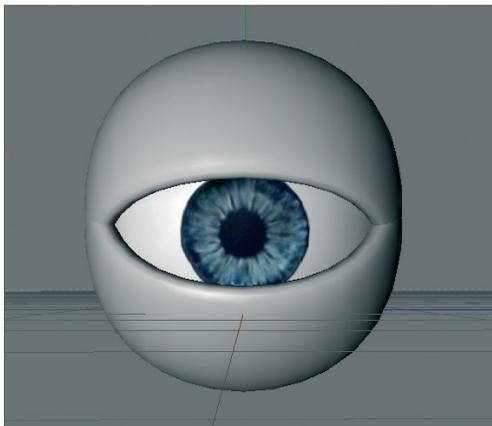
Switch the visibility of the Subdivision Surface objects back by clicking again on the dots next to the object in the Object Manager, making them gray. Click on the Texture Tag at the right of the Object Manager next to the object. It's the material that we applied to the eyeball. You can recognize it in the mini preview of the texture in the Object Manager.



Once you have selected it you will see its parameters in the Attributes Manager. Adopt the settings you see in the next screenshot:



We have just aligned the texture on the eyeball mesh by changing the Length U and Length V parameters. The offset setting put the texture in the correct position. If you rotate your view again you will see that the iris texture is positioned correctly.

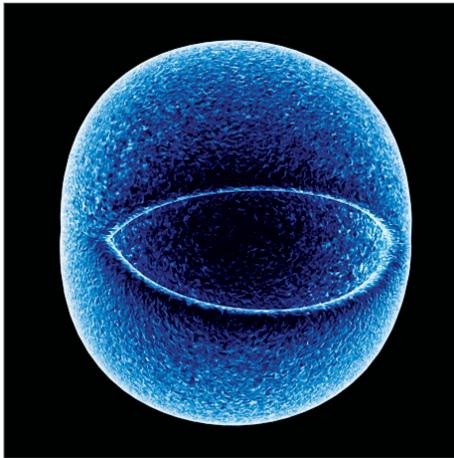


Tip: If you want to undo an accidental change to the view just press Cmd+Shift+Z (Mac: Cmd+Shift+Z). This function is useful if you have inadvertently rotated the perspective view instead of the editor view. You can also select edit/undo view in the main menu of the editor view. The texture will complete our model. Experiment with the parameters of the individual channels to find out how they affect the material. At this point we would like to offer you a few additional tips.

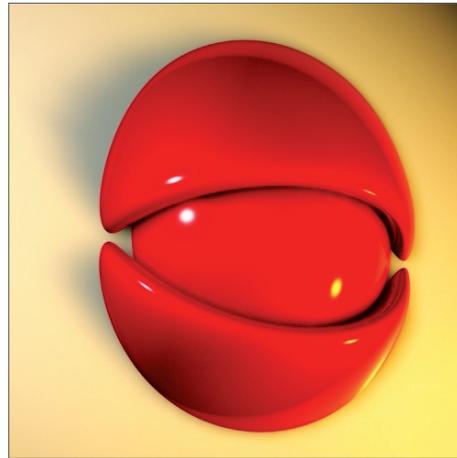
If you own Cinema 4D Visualize or Cinema 4D Studio you can render human skin, for example, very realistically using Subsurface Scattering. The shader Surface Scattering makes it possible. By placing this shader in the luminance channel (click on the small arrow next to Texture and select Subsurface Scattering from the Effects menu/Subsurface Scattering) the effect is created when rays of light meet a slightly transparent object. Some rays infiltrate the object further and are dispersed, others are directly absorbed or bounce off. Further possible uses for this effect would be for materials such as plastic, milk, candle wax or figurines made of jade.

You can load black-and-white textures into the alpha channel to influence the material based on the texture's brightness, similar to the way you would use them for the bump or displacement channels. The texture's black areas would be rendered with a transparency of 100%. As the texture becomes brighter the transparency is reduced accordingly. White would have a transparency of 0%

If you choose Shader instead of New Material under create in the Material Manager you will see a list of shader presets. The advantage of these shaders is that you don't have to worry about mapping your texture or seams in your texture because a 3D shader will be calculated for the 3D space. Here are a couple described in detail:



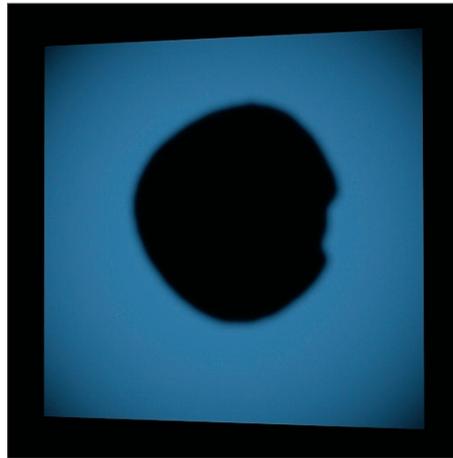
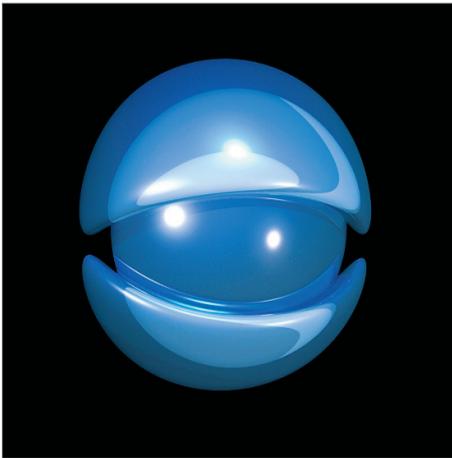
Cheen: Generates an electron microscope effect.



Danel: Very good for simulating high-gloss finish



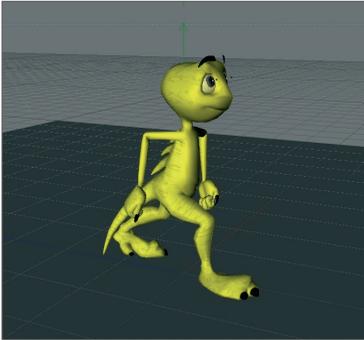
Banzi: Lets you depict various types of wood.



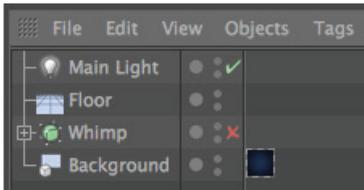
Banji: Calculates complex lighting situations with glass and even makes rear-projection (shadow casting) on partially transparent materials such as rice- or canvas paper possible.

4. Quick Tutorial: Light

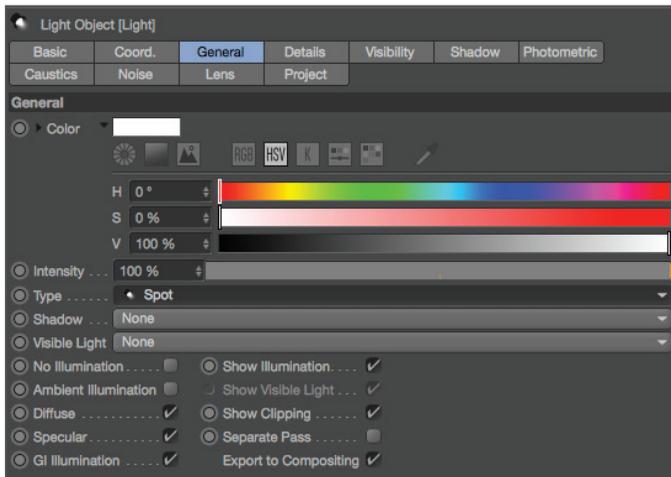
If you are already familiar with lighting a scene in the real world then you will feel right at home with the BodyPaint 3D light objects. They can do everything real lights can do – and quite a bit more. In this tutorial we will set up a 3-point lighting arrangement. This type of arrangement is used often in portrait photography to achieve an even lighting and is an excellent method for lighting an object quickly and professionally in the 3D world. Open a new (empty) scene. Create a floor object (Create/Environment/Floor). Our little amphibian man will be our lighting victim. Merge the file, QS_Light.c4d into the scene (Main menu: File/Merge). Adjust his position so he's standing on the floor. Adjust your editor view so the entire figure is visible to you.



A 3-point lighting arrangement begins with setting a key light. As the name suggests, this light emits the main lighting for the scene and will cast the main shadows. Create a light object (Objects/Scene Create/Light/ Light). Name it Main_Light (double-click on the name) in the Object Manager.



BodyPaint 3D has several different types of light sources. The key light will always be created by default. A point light emits from its center in all directions. For our key light we will need a spot light which we can aim directly at the object. To make the key light a spot simply go to the Attributes Manager and switch the light from Point to Spot.



Now our light source has been transformed to a spot. A spot acts like a flashlight. BodyPaint 3D offers spots with square and round cones of light. This cone is visible in the editor and can be manipulated. Now we will aim the spot at our figure.

Position the light at the following coordinates in the Attribute Manager:

X= 300

Y= 580

Z= -300

at an angle of

H= 45

P= -45

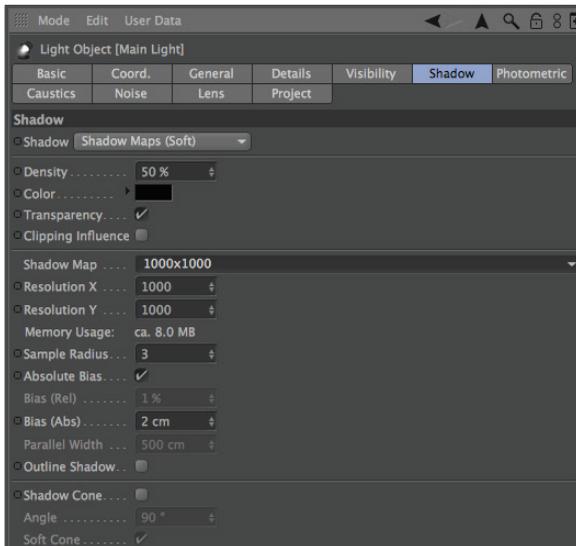
degrees (enter the values and click on the Apply button).

Render the scene (Cmd/Ctrl + R).



The light now falls at an angle onto our object (If this is not visible in the Editor it may be due to the fact that your display mode is set to Quick Shading (uses a single default light source) instead of Gouraud Shading (uses all scene lights)). Of course the exact position of the light is strongly dependent upon the camera's angle. Unfortunately the light is not casting a shadow, letting the figure look like it's floating. Cinema 4D's lights have an advantage over real light in that you can choose which kind of shadow, if any, they should cast – a plus for any studio photographer. In the General menu of the Attributes Manager, set the light's shadow to Shadow Maps (Soft). We don't want the shadow to be completely black so we'll make it a little transparent.

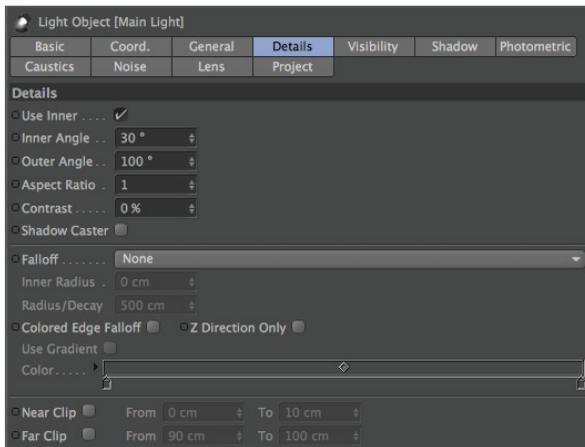
In the Shadow menu, set the shadow density to 50%. Select 1000 x 1000 as the shadow map. Render the scene.



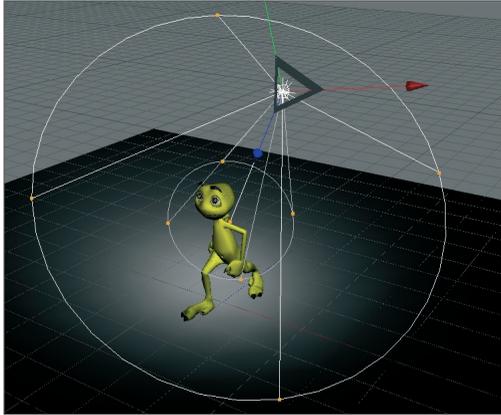
BodyPaint 3D offers three types of shadows: RayTraced (Hard) – a shadow with sharp edges, Shadow Maps (Soft) – a shadow with soft edges and Area – a shadow that becomes softer the further it's away from the object, resulting in the most realistic shadow effect. Try the other two shadow types. Careful, the area shadow can take a long time to render! The larger shadow map allows the shadow to be rendered more accurately.

The light's cone is a little too small. We will change this as follows:

Switch to the details menu in the Attributes Manager and set the Inner Angle to 30 degrees and the Outer Angle to 100 degrees.



You will see the result in the editor right away. You can also edit the light's cone by dragging the orange handles (If your graphics card will support it you can set the editor's display mode to Enhanced OpenGL with activated shadows. (Viewport: Options/Enhanced OpenGL) Generally speaking, OpenGL offers a much more precise depiction of your scene and gives you an impression of how the shadows will fall).



Now we're happy with our key light. Next we will create a more even lighting by brightening our figure a little from the other side.

Create another light source in the scene and name it "Brightener". Place it at the following coordinates:

X= -360

Y= 225

Z= -230

Select Area as the type of light.

Since the brightness of the lights in the scene is additive, we must "dim" the brightener a little.

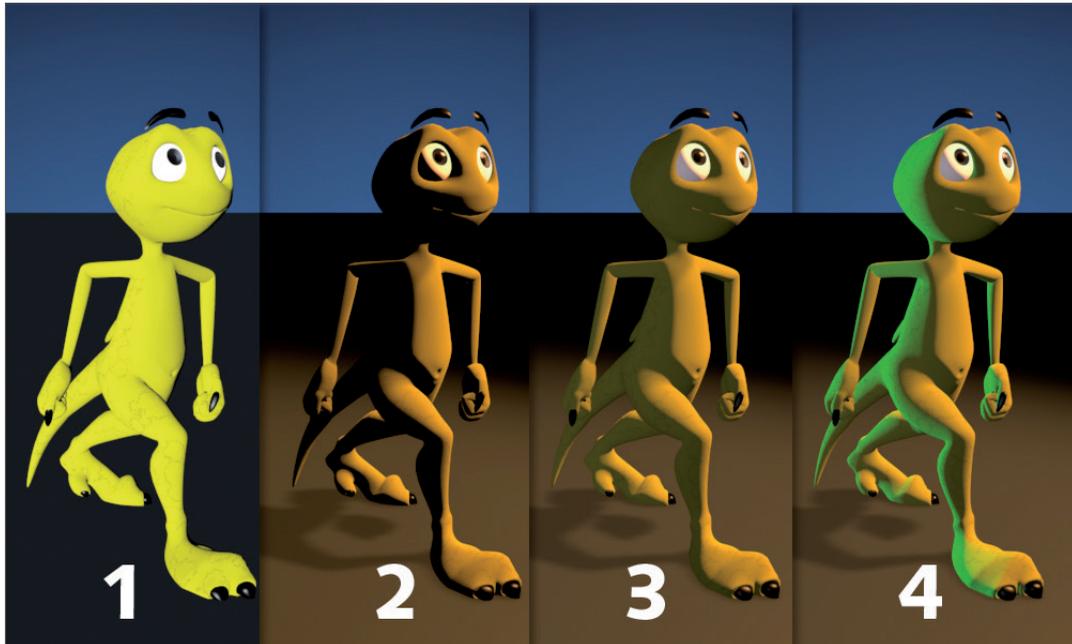
Reduce the Intensity in the General menu to 40%.

This area light illuminates the figure from a different angle and softens the contrast somewhat. It won't cast a shadow since this would cause "crossing" of the shadows and make the object look bad.



The scene is now pretty evenly lit, but we want to give it a little more pep. Create another light source, name it Color and, in the Attributes Manager, set its type to Infinite. Set its color to turquoise and set its H angle to -160. The position of an infinite light is irrelevant since it always lights your scene in the direction of the Z axis. This is why we will leave it at the point at which it was created. It gives our Amphibian an interesting color edge and sets him off of the background a little.

Your scene's mood can be changed by simply changing the color of some of the lights used.



That completes our classic 3-point lighting arrangement. Now the real work starts. If the scene has a background, which is often the case, it will have to be lit as well. With the proper use of point lights details in the scene can be "brought to light" very nicely. But don't overdo it. With good lighting, less is often more. Only add lights when necessary and if the scene can actually benefit from them. Two more tips before we end: If you have several lights in a scene and are not sure which light is lighting what, simply turn off (green check mark) all other lights in the Object Manager. The light which remains will be the only one visible.

There is a trick how you can determine how to best light which objects in your scene. Select the desired light in the Object Manager and activate Link Active Object in the editor view's Cameras menu. Selecting this option lets you view the scene from the point of view of an active object, in our case the light. Moving the editor view will automatically change the position of the light when in this mode. This way you can see how the change of position of the light affects the lighting of the object in realtime (Gouraud Shading must be active in the editor view). Once you have reached the desired angle and position you can return to the editor view by selecting Editor Camera from the Cameras menu.

5. Quick Tutorial: Rendering

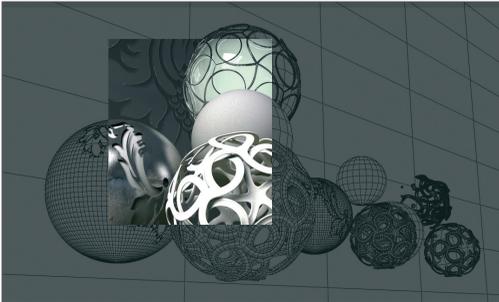
You've been a busy bee. You have created a scene, set up the lighting, animated objects and assigned materials to them. Now we want to see the result of all this work. What you have to do is to transform this 3-dimensional scene into a 2-dimensional image (in the case of an animation it would be an entire series of images). We will "render" the images. Open the file `QS_Render_01.c4d` to work through the following tutorial. BodyPaint 3D offers a wide variety of options for rendering your 3D scene.

1. Using the main menu
2. The keyboard shortcut `Ctrl+R`
3. By clicking on the icon in the editor window



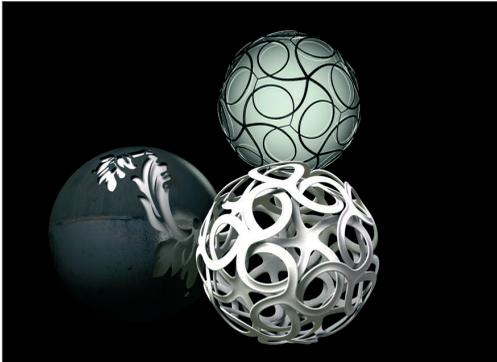
Use the method with which you feel most comfortable.

Often we don't necessarily want to render the complete editor view but only a small part of it. This is also no problem. Select `Render/Render Region`. The cursor will be transformed into a cross. Drag a frame around the region you wish to render.

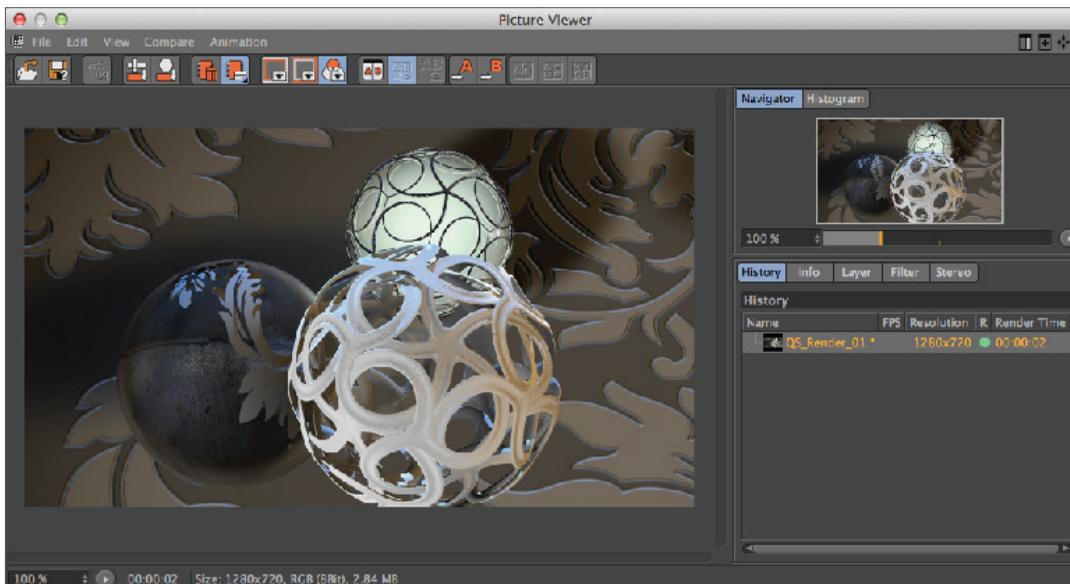


The second possibility is to render only a single object.

Select the object "Master" in the Object Manager. Select the command (Render/Render Active Objects).



Only the selected objects will be rendered. Rendering the editor view gives us a quick overview of the scene but it does not offer the possibility to process this image further, to save it to the hard drive, for example. Select "Render"/"Render to Picture Viewer" or press Shift+R. What good is the best rendering if you can't save the images it generates? Of course there is a command with which you can do this. Select Render/ Render to Picture Viewer or press Shift+R. The picture viewer will open in a separate window in which the scene will be rendered. When the image has been rendered select File/Save Picture As. A further window will open. Select the appropriate format and confirm with OK.



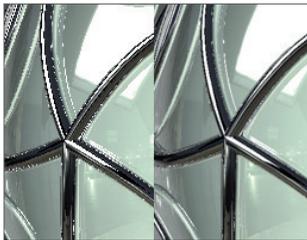
Of course you can also save a series of images as an animation. To do so, change the Type from Still Image to Selected Frames, and set Format to QuickTime Movie, for example. Rendering to the Picture Viewer has the additional advantage that you can continue working on your scene if the image should take a while to render.

Close the picture viewer and open the Render Settings (Render/Edit Render Settings).



You use the Render Settings to determine what our final image will look like. Everything from size, quality, single image or animation can be set here. Render the image again in the editor window and take a closer look at the result. It looks a little pixelated. You can see a similar effect along the edges of the object. This is called “anti-aliasing”. This term refers to how smoothly an edge has been rendered.

Set Anti-aliasing to “None” in the “Render Settings”.



The effect is much worse without anti-aliasing. Set anti-aliasing to “Best” and render the scene again. All edges have been rendered sharp as a knife without being pixelated.



© Fredi Voss

Sculpting

Welcome to the Quickstart sculpting tutorial. In this tutorial we will show you how to get started with the BodyPaint 3D sculpting tool. We will show you how to create the object in the image below.



At the left is the base object. It contains practically no details and looks quite bland. On the right side is the same object after being modified using the Sculpt tools. The comprehensive toolset makes it possible to create incredibly detailed surfaces. After you complete this tutorial we encourage you to experiment with the various tools to see what they can do.

Since this is an introductory tutorial whose aim it is to show users the basic sculpting functions in BodyPaint 3D, we will only sculpt the head.

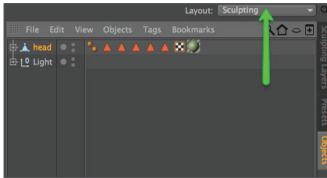
Before we get started and to help inspire you to higher heights, let's take a look at a finished version of our turtle in its entirety.



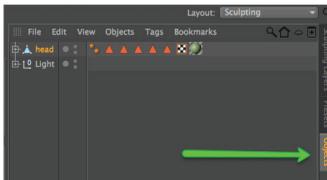
© Augenpulver – <http://www.augenpulver-design.de/>

Open the file 'Sculpting_Turtle.c4d'.

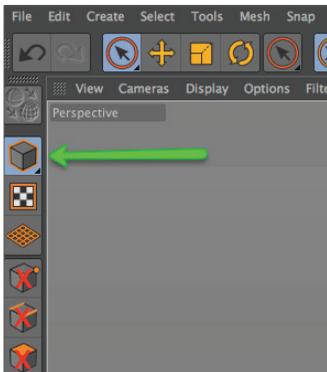
At the top right of your interface, select Sculpting from the Layout drop-down menu.



To begin sculpting we must first select and subdivide the object. Click on the Objects tab at the right of the Object Manager. Attention: If you start with a primitive object instead, you need to convert it in a polygon object first (with the object selected press „c“ on your keyboard).



Select the object 'head' in the Object Manager. Make sure that you are in Use Model mode in the left Icon Palette. If not still there, switch back to the Sculpting Layers tab in the Object Manager.



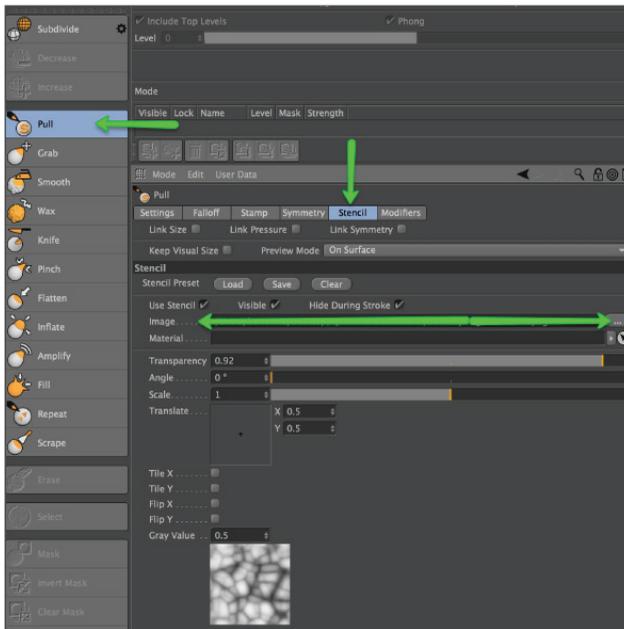
Next, click on the Subdivide button 6 times. The first click transforms the polygon object into a Sculpt object and automatically assigns a Sculpt tag to the object. The first click will give the mesh a sculpting Level of 0. Each additional click will subdivide the mesh further. After 6 clicks your mesh should have a Subdivide level of 5 (the Subdivision level is displayed in the Sculpting Layers tab's Level field). Although the wireframe display is useful for polygon modeling it can be a hindrance for sculpting because of the high level of subdivision. If the polygon object's wireframe obstructs the view of the Sculpt object, select the Pull brush and press the W key on your keyboard.

This will disable the wireframe display. Any brush stroke we make can be undone by simply selecting Undo. Generally speaking, a graphics tablet is better suited for sculpting than a mouse because it lets you control your strokes more precisely.

We will now add a Sculpt Layer to our base object. In the Sculpting Layers tab, select Add Layer from the Layers menu. Next, select the Pull brush and switch to the Stencil tab in the Attribute Manager. Drag the texture Turtleskin.png from the 'tex' sculpting project folder into the Stencil tab's Image field. Alternatively you can click on the button at the right of the Image field and select the texture from the dialog window.

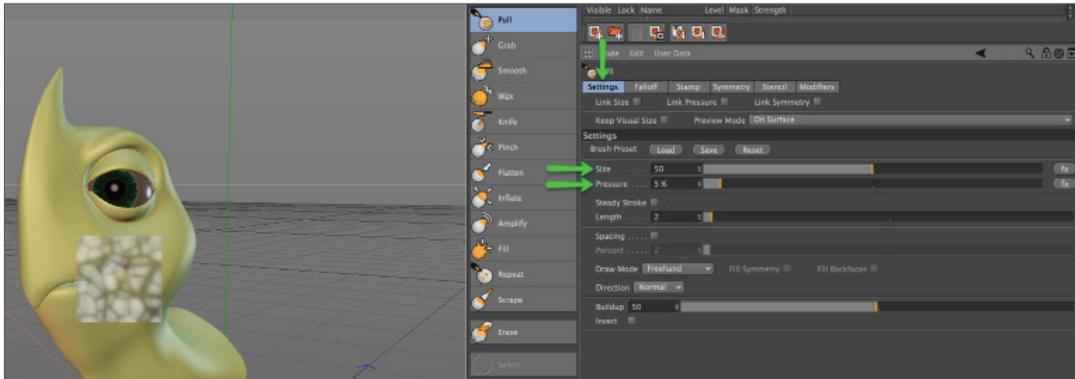


© Dimitris Katsafouros



The Stencil you just selected will appear in the Viewport. You can adjust its transparency in the Attribute-Manager as you see fit but a value of 0.5 is a good value with which to start. If the Stencil is not visible in the Viewport, enable the Visible option in the Stencil menu in the Attribute Manager. Enable the Tile X and Tile Y options in the Attribute Manager (Stencil tab). This ensures that the Stencil will be applied across the object's entire surface. Finally, we have to adjust the Stencil's size. The structure applied by the brush is always in relation to the size of the Stencil/object. This means that you can adjust the Stencil size as well as the camera's distance from the object to apply a larger or smaller structure. The Stencil will always lie perpendicular to the camera's angle of view, no matter how you position the camera. Scale the Stencil to reflect the size in the image below by using the Attribute Manager's Scale setting or by using the combination T + RMB until you achieve the desired size. In the brush's Settings menu, set Size to 50 and Pressure to 5%.

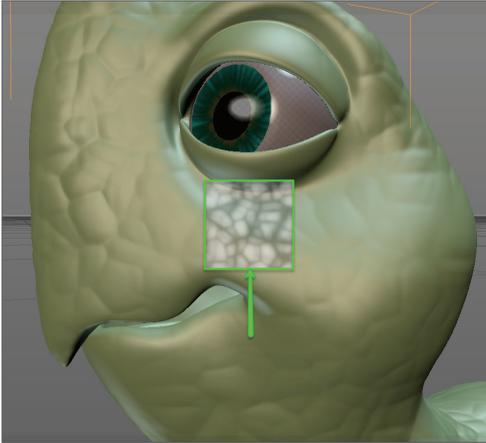
Next, switch to the side view in the Viewport, make sure that you are on Layer 1 in the Sculpting Layers tab, and paint across the turtle's head with the brush. Apply the Stencil using different perspective views and make sure that you only change the camera's angle of view to the object and not its distance from the object. Otherwise the Stencil will be applied in different sizes. When you're finished, press the Q key to hide the Stencil (and again to make it visible).



Tip: If you use a graphics tablet you can click on the fx button at the right of the Size or Pressure setting to link the respective function to the pressure-sensitive behavior of your pen. Your turtle's head should look similar to the image below when you're done.



Leave the Stencil size as it is and zoom in on the object. Use the image below as a reference.



Reduce the brush size to 10 and paint over the lip and eye lid regions. The result should look like this:



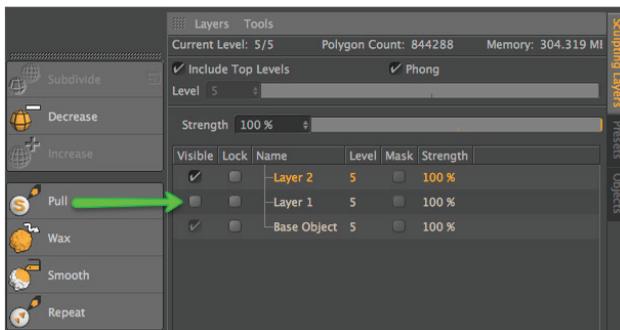
In the next step we will apply a Mask. Click on the Mask button at the bottom of the Sculpt Palette. Add a new Layer as you did before, leave the Size value set to 10 and set Pressure to 5%. Make sure you are on Layer 2 and paint across the turtle's neck to create a surface similar to the one in the image below.

Tip: Pressing the Ctrl key while painting will delete the Mask; pressing the Shift key while painting will smooth abrupt transition. The same applies to the sculpting process: Pressing the Shift key while sculpting will apply a smooth sculpting effect.



Next, click on the Invert Mask button in the Sculpt Palette and then select the Pull brush. Set the brush's Size to 50 and its Pressure to 5%. Paint across the surface of the head as you did before. You will notice that only those regions not affected by the Mask are modified by the Pull brush.

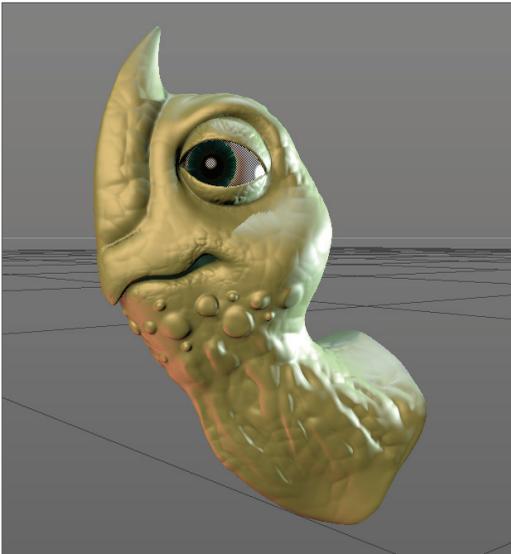
Smoothing tip: While smoothing the folds along the throat we don't want the structure on Layer 1 to be affected. This can be prevented by simply hiding Layer 1 for the duration of the sculpting process.



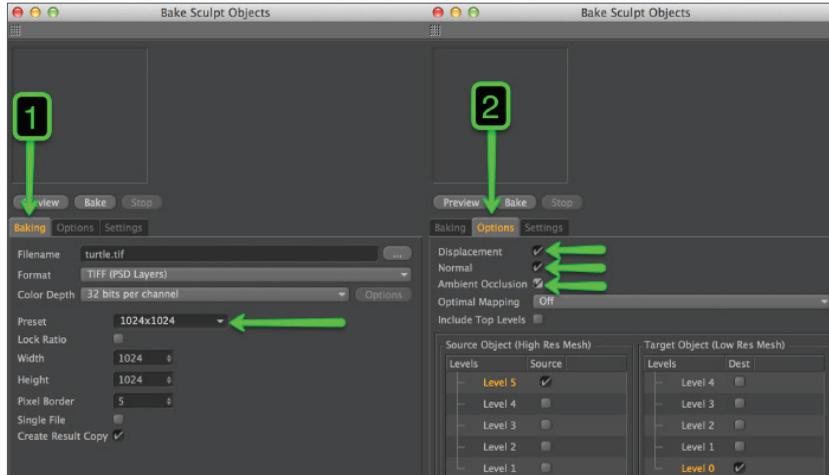
The final result should look similar to the image below:



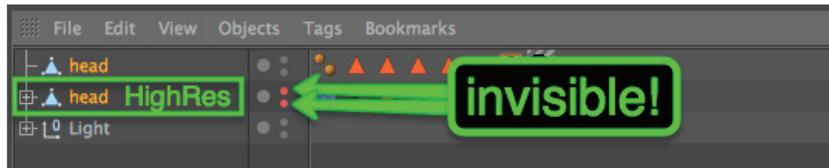
We will apply one additional brush to complete our turtle's head: The Knife brush. Delete the Mask by clicking on the Clear Mask button in the Sculpt Palette. Alternatively you can simply hide the Mask in the Sculpting Layers tab, which will make it available for future use. Add a new Layer and select the Knife brush. Set its Pressure to 10% and its Pinch value to 0.25. Paint along both sides of the nose to create a ridge as shown in the image below.



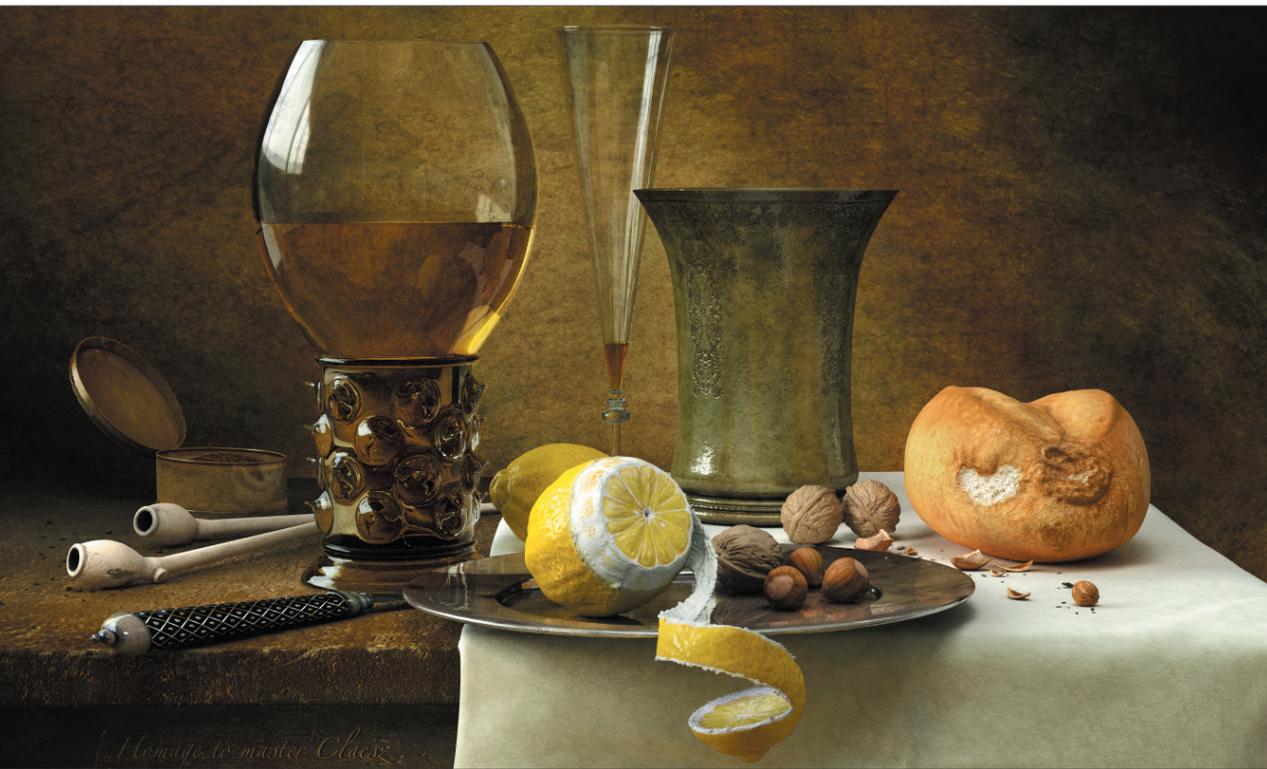
This completes our turtle's sculpted head! Baking an object that contains objects with millions of polygons can reduce the number of polygons to a manageable amount and will produce exactly the same result for rendering! Baking generates Displacement and Normal textures that, simply put, subdivides the geometry during rendering and lets you work with low-res objects in the Viewport while maintaining filigree details for rendering. Baking will not affect the sculpted surfaces. To bake your object, click on the Bake Sculpt Object in the Sculpt Palette and use the settings shown in the next image:



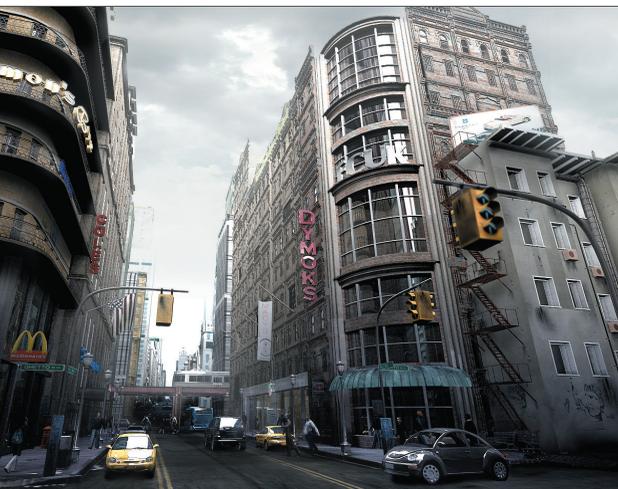
After all settings have been made, click on the Bake button. Before rendering the Project, make sure that the original object is hidden so you don't end up rendering both the high-res and the low-res object at the same time.



Even though this tutorial used an existing object as a basis for sculpting, you can also begin with a spheresphere, for example, and create fantastic objects using the Sculpt tools in BodyPaint 3D. After making the sphere, or any other Primitive, editable (C key), there's practically no limit to what you can sculpt.



© Kornel Ravadits



© Simon Hellwig



© Kevin Capizzi



© Toni Ramon Sanchez



© Josh Grundmeier – www.fuseanimation.com

