



# Let's Jump Straight In!

## FREEFORM PRO



First time using FreeForm Pro? Let us introduce you [HERE!](#) Find out all the cool things this Plug-in can accomplish, and then learn how to create them yourself!

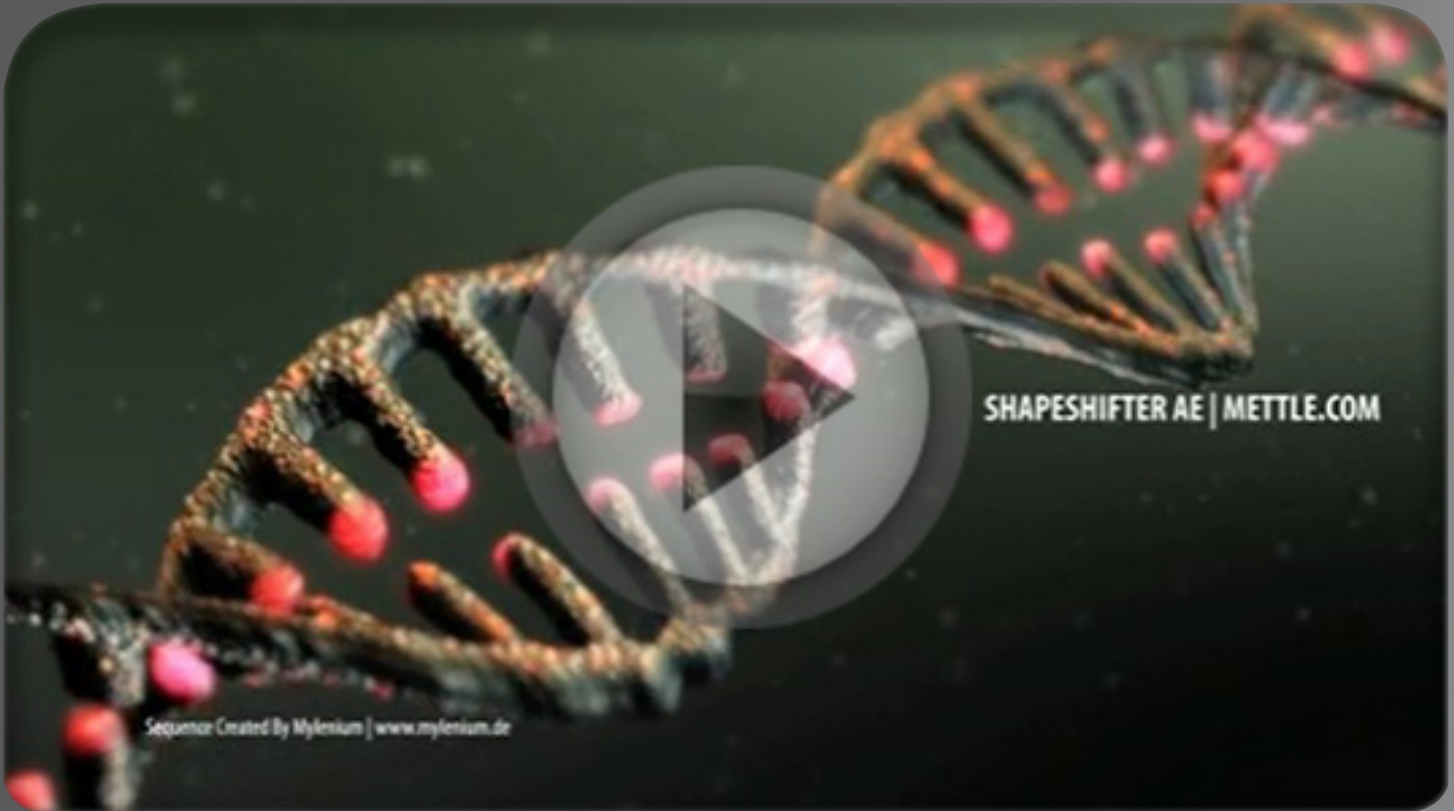


If you want to go deeper and get technical, jump [HERE](#) to acquaint yourself with all the nuts and bolts of FreeForm Pro. All controls are explained thoroughly; perfect as a jump-reference and refresher!



Let's Jump Straight In!

# SHAPESHIFTER AE



If this is your first time using ShapeShifter AE, head over [HERE](#) to get to know what this Plug-in is all about. We'll present you with a gallery of beautiful works, along with a selection of video tutorials so you can create what you see!

Or, you can jump [HERE](#) to learn ShapeShifter AE in all its entirety. We'll cover every nook and cranny of this powerful Plug-in, so you know exactly what each control can do!





# NOTE TO READERS

- 01.** This User Guide is an “interactive” PDF file, which means it contains embedded videos. A video is marked by its play-icon, and to play, just click the video thumbnail. When you hover the mouse over the video, navigational buttons become visible, and you can stop, pause, or seek the video.
- 02.** PDF-viewer compatibility is important. The default PDF reader from Adobe, Adobe Acrobat Reader, is perfect for viewing such interactive PDFs. If your PDF reader doesn’t have the ability to playback videos, you can’t click the play-icon to play the video; the video will be shown as a static image. You can download Adobe Acrobat Reader from [here](#) (official Adobe Acrobat Reader page); from that web page, make sure to uncheck the Optional Offers (“McAfee” and “True Key” installers) before proceeding.
- 03.** To help you navigate this complex user guide, we have provided a bookmark-style Table of Contents. This is automatically & always visible on the left area of your PDF-viewer, but if it’s not, you can enable the “bookmarks” panel on your PDF-viewer. Simply click on a bookmark and you’ll jump to that particular section.



# COPYRIGHT

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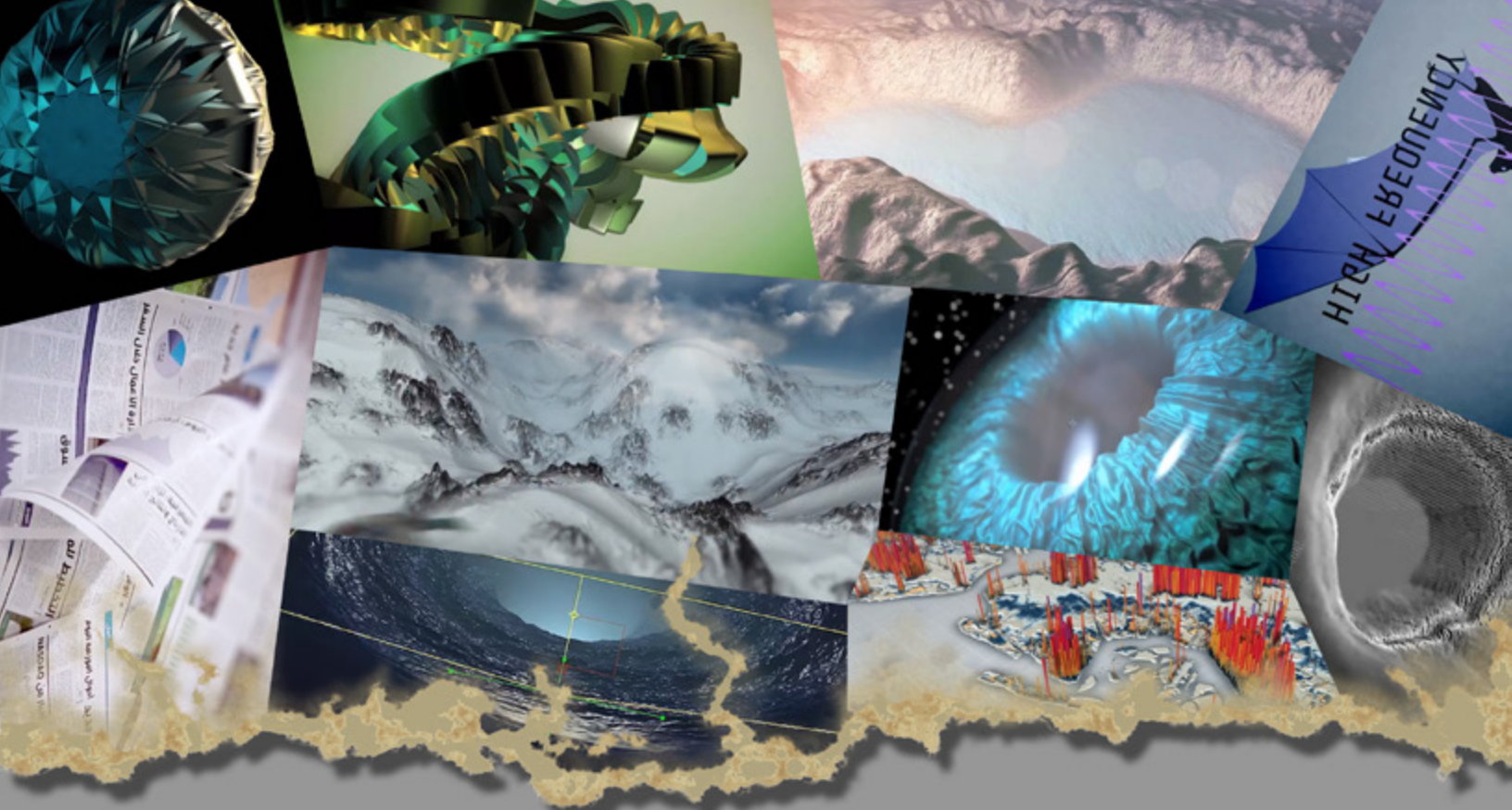
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# Book 1: FREEFORM PRO





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# PART 1:

## INTRODUCTION

Here you will be introduced to FreeForm Pro. You will understand its capabilities, and the kind of projects it's commonly used for. We will then present you with a gallery of beautiful works done by talented artists, all using FreeForm Pro as their main tool. Finally, you will be presented with a list of video tutorials so you can create some stunning arts yourself!



# CHAPTER 1:

## What is FreeForm Pro

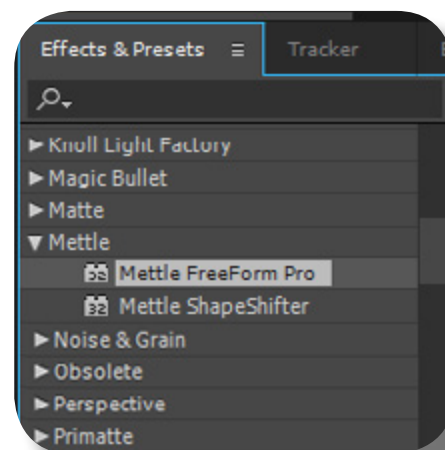


Welcome to FreeForm Pro! This powerful 3D plug-in from Mettle lets you create true 3D assets entirely within After Effects, bypassing some of the needs to use external 3D programs; in fact, you can achieve some results faster in FreeForm Pro than in those programs.

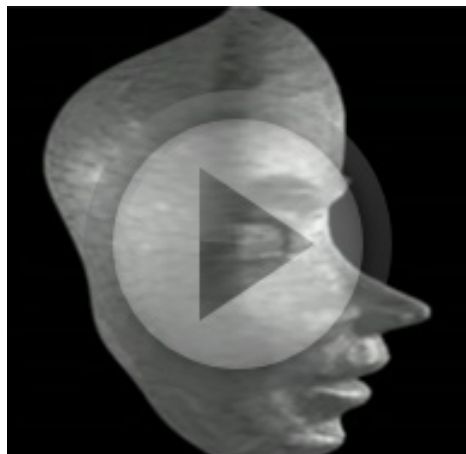
In this Chapter, we will explore what FreeForm Pro is, and all its different capabilities. We will also explore the tasks that FreeForm Pro is generally used for. Once you're introduced to FreeForm Pro, you can head to Chapter 2 (click [here](#)) to learn and create beautiful artworks yourself using the various tutorials that we provide!

### WHERE YOU CAN FIND FREEFORM PRO

FreeForm Pro is a plug-in in the form of an Effect. As with any other Effects in After Effects, you can find it from the menu Effect -> Mettle -> Mettle FreeForm Pro; alternatively, you can find it from the “Effects & Presets” Panel, under the “Mettle” folder (just type “FreeForm Pro” in that panel's search box).



## WHAT KIND OF 3D OBJECT FREEFORM PRO CREATES

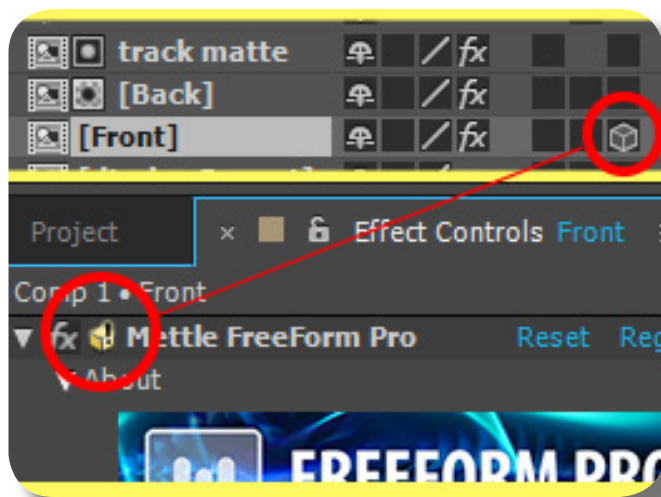


In its most fundamental function, FreeForm Pro creates a 3D surface. This is a flat 2D layer that has been deformed in all three axes (X, Y, and Z). As a “surface”, the 3D object has no extrusion or “thickness” to it; but with some tricks, you can create a complex 3D object with actual volume. If you want to create 3D objects with symmetrical extrusion/thickness, please look at the sister plug-in, ShapeShifter AE.

## INTERACTING WITH AE LIGHTS & CAMERA

The resulting 3D object from FreeForm Pro can interact normally with AE Lights. It can cast shadows, have reflections and specular highlights, and other attributes related to lights. Although admittedly, just like other 3D-creation Effects for AE, it does not interact normally with other 3D layers in the

same Composition; for example, it can not cast shadow to other 3D layers (only casts shadows on its own Mesh), and it can’t have a normal “overlapping view” with other 3D layers when you rotate the camera around. But with some tricks, you can solve these problems.



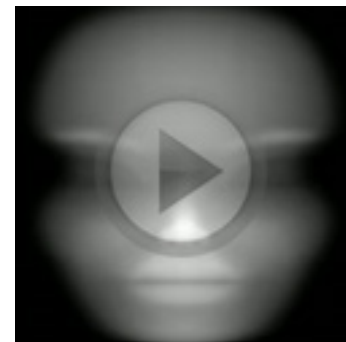
The 3D object can also interact normally with AE Camera, which you can use to view around the 3D object. But please note that in AE terms, the layer that you applied FreeForm Pro to must be a 2D layer; this is always the case with 3D Effects in AE, not just FreeForm Pro. That is, you should not turn ON its 3D switch, otherwise a warning icon will appear, and the 3D appearance will be broken.

## HOW FREEFORM PRO CREATES 3D OBJECTS

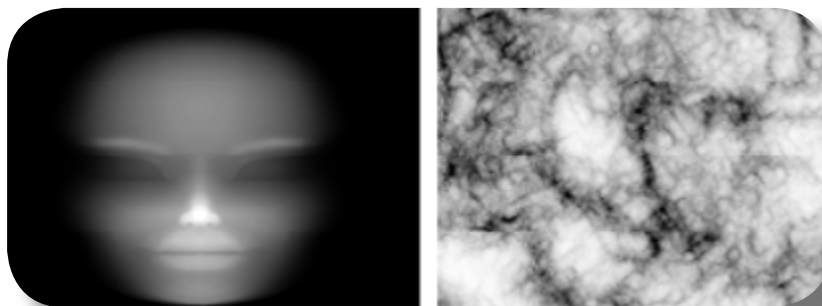
There are two basic ways that FreeForm Pro creates a 3D surface: by vertex-tangent deformation, and, by Displacement Map. With the former, you use the mesh “grid” that contains such vertex points and tangents to deform your layer; this is good for creating a smooth & general deformation. If you’re familiar with the “Mesh Warp” effect, then you know how it works; just add the Z axis to the deformation and you get similar result. Jump [here](#), [here](#), and [here](#) to understand the control groups specific to Vertex-Tangent deformations.



With the latter method, you can use the luminance value (or R/G/B/A channel strength) from another layer, to define the 3D deformation on your layer. In other words, you can use a black-white (grayscale) image to define the 3D protrusions on your flat 2D layer. This method allows for a very detailed 3D sculpting/modeling, for example to create organic-looking objects. Jump [here](#) to understand the control group specific to Displacement Map.



You can manually draw the black-white image yourself using Photoshop or directly within After Effects using the Brush Tool or Shape Layers. Or, you can use texture-generating Effects such as “Fractal Noise” and “Turbulent Noise”; the Fractal Noise effect will be discussed in a later chapter (you can jump [here](#)).







## CREATING & MANIPULATING A SWARM OF 3D OBJECTS

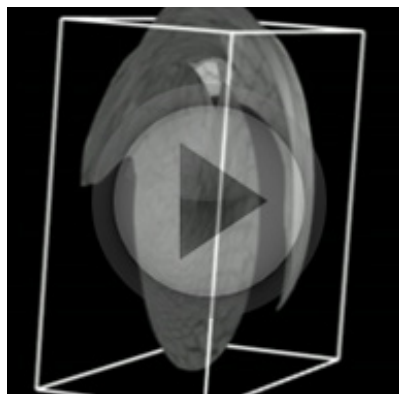


In addition to creating 3D surfaces using two methods described before, FreeForm Pro also has the ability to create “swarms” of 3D objects that you can manipulate to achieve some astonishing results. With the “Generator” feature, you can create a swarm of your single 3D object, essentially duplicating it, and apply various manipulations to it. Jump [here](#) to explore the “Generator” feature in depth.



There is also another way of creating a swarm of 3D objects, and that is using the “Primitives” feature. This feature “divides” (instead of duplicating) your single 3D object into a swarm of primitive objects. The primitive objects include Cubes, Rods, Planes, Tetrahedrons, Octahedrons, and Icosahedrons. All these methods of creating & manipulating swarm of 3D objects let you create astonishing abstract motion graphics results. Jump [here](#) to explore the “Primitives” feature in depth.

## TWISTING, BENDING, AND BULGING THE WORLD



Once you have created the 3D object (or a swarm of it), you can further apply 3D deformations to it using the “World Space Deformations” feature. This feature allows you to twist, bend, or bulge your 3D object(s) as a whole. This is perfect for further spicing up your motion graphics, or to create certain shapes. Jump [here](#) to understand the “World Space Deformations” feature.

## CREATING THE SKY, FOG, AND MIST

With FreeForm Pro, you have the ability to simulate the appearance of Sky. This is an image (or a video) that is wrapped around as a “dome”, encompassing your whole Composition. So when you view around using the Camera, the Sky is always there. There is also the ability to simulate Fog and Mist, for example to create atmospheric distortions or local mists. All these features are contained within the “Environment” group, so jump [here](#) to better understand these three features.



## COMMON USES FOR FREEFORM PRO

With all its functions, FreeForm Pro can be used in myriad ways to create beautiful & stunning artworks, or to help and complement other tools in After Effects to achieve certain tasks. Really your imagination and After Effects skills are the only limit. Here are some of the common tasks that artists relied on FreeForm Pro to accomplish:

- 01.** Creating three-dimensional body parts for character animation. As you may know already, After Effects has limited capability to create functional 3D asset for character animation. There are some built-in tools & tricks that can achieve this, but with severe limitations. With FreeForm Pro, you're at full liberty to create & manipulate the 3D assets for character animation. Usually it is used to create a 3D head, so it can rotate and look around, instead of the bland two-dimensional head commonly associated with AE puppeteering; but if you're creative & skillful enough, not only the head can be made 3D, but other body parts as well such as the torso, arms, and legs.





But you must keep in mind that character animation/puppetteering in AE is distinct from the full blown 3D character animation: it is more of a 2.5D character animation (or 2.7D if you use FreeForm Pro). It is not necessarily worse than the full blown 3D animation, because it has a distinct flavor & aesthetic to it. But one thing is certain: that this kind of 2.7D character animation is a lot faster to produce than its full blown 3D counterpart. So you must keep this in mind when using

FreeForm Pro: create 3D body parts with 2D animation in mind, not to create a full-fledged 3D animation, otherwise, you'll be bogged down in technical pits. First explored and brought to full attention by the talented animator Daniel Gies, utilizing FreeForm Pro has become one of the de facto standards for doing 3D character animation in After Effects.

**02.** Creating a fluttering or undulating cloth, such as flags. This is one of the most obvious uses of the plug-in, and rightly so because FreeForm Pro creates a 3D “surface” from your flat 2D layer; this surface has organic protrusions/undulations that can be animated gracefully.



**03.** Creating 3D terrain/land contour. Obviously, if FreeForm Pro can create undulating surface for flags, then it can be used to create terrain/land contour, especially with the help of its “Environment” feature, which includes simulating the Sky, Fog, and Mist. Mettle provides 12 premium AE project-files that let you create Deserts, green Valleys, and mountainous snowpeaks with ease using FreeForm Pro. You can obtain the “Terrain Packs” [here](#).





**04.** Creating realistic water surface. Again, it must be obvious that if FreeForm Pro can create complex land contour/terrain, then it must also be able to create a dynamic water surface, either raging waves or calm ponds. This is especially true because FreeForm Pro also contains an amazing “Fresnel” feature, that allows you to create realistic water reflection based on the viewing-angle. Mettle has provided the premium “Aqua Pack” project-files that let you create realistic water surface in no time; you can obtain it [here](#).



**05.** Creating abstract motion graphics. With its Displacement Mapping feature, coupled with the Primitives, Generator, and World Space Deformation features, FreeForm Pro is a perfect choice for creating abstract 3D motion graphics entirely within After Effects. You may also want to look at the sister plug-in, ShapeShifter AE, to achieve this result.



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# CHAPTER 2:

## Gallery and Tutorials

A feast for your eyes! Enjoy this gallery of stunning 3D artworks all done using FreeForm Pro! Please show the artists some love; you can click on the links to stream the videos on-line. These talented artists were once just like you, knowing little about FreeForm Pro. But with enough perseverance to study and experiment, and with the help of various

tutorials, they're able to produce great 3D artworks. Jump over [here](#) to view the list of tutorials, and go from Noob to Pro! If you're already familiar with FreeForm Pro and thirsting for more knowledge about it, head over [here](#) to learn about all the controls & features that FreeForm Pro offers.

### GALLERY OF ARTWORKS

- 01.** “True Detective Title Sequence”. Opening Title sequence for the hugely popular HBO series. Chris Morris ([studiobreeder.com](#)) used FreeForm Pro to dimension-alise the footage in After Effects during compositing. Visit the video: [here](#) (Vimeo) or [here](#) (Youtube).



- 02.** “CFDA Fashion Awards 2015 NYC”. Title sequence by ([denial.of.service](#)) for CFDA Fashion Awards. Created in After Effects using FreeForm Pro plugin for 3D effects. Also some very clever use of Javascript & Python. Director: Barnaby Roper (Cadence NY) whose clients include Bowie and Banks. The CFDA Fashion Awards recognize extraordinary design excellence in various fashion endeavors. Visit the video: [here](#) (Vimeo). Read the blog post about it: [here](#)

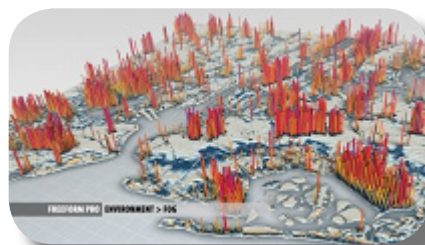




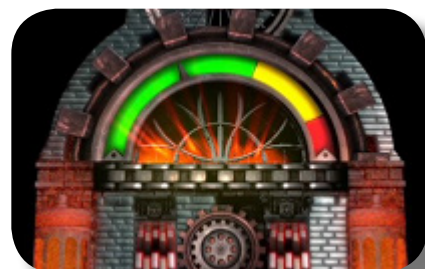
**03.** “Do You Know What Nano Is?”. 2011 Webby Award Winner for “Best Animation”. Created by Dan Gies, (E.D. Films) with his own original illustrations and FreeForm Pro in After Effects. Nano may mean small, very small, but when it comes to making your body work it is big, very big. If your fingernail is about one millimeter thick, and a nanometer is one millionth of a millimeter, you can imagine there are a lot of nanomaterials making up that small space. Made for a junior audience, yet appealing and informative for all ages, the Webby Award winning short is available in Portuguese, Spanish, French, English and Mandarin. Visit the video: [here](#) (Vimeo) or [here](#) (Youtube Part 1) and [here](#) (Youtube Part 2).



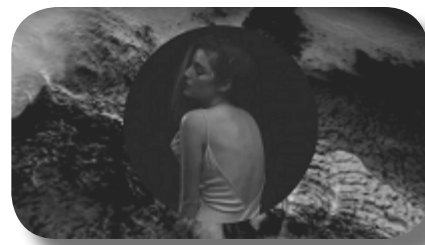
**04.** “NYC Infographic”. Animated terrain Map of New York City and surrounding areas is rendered in 3D with animated bar charts. Created in After Effects with FreeForm Pro by Lutz Albrecht. This breakdown video shows different steps/layers. All done in After Effects, from a single jpeg image, using FreeForm Pro. Visit the video: [here](#) (Vimeo).



**05.** “Notre Dame Church Projection Mapping”. A Church facade is transformed into a canvas for blooming flowers, growing vines, a glowing jukebox, waterfalls, flying bricks, etc using After Effects + 3D plugins. All the 3D depth and brick animation is created with FreeForm Pro in After Effects. With scripts from aescrpts.com for automation. FreeForm Pro was also used for displacement of the entire animation to create the illusion of depth and to fit snugly on the church facade. Visit the video: [here](#) (Vimeo).



**06.** “BANKS - Brain”. Official music video for “Brain” from the singer BANKS. Terrain generated in After Effects with FreeForm Pro. Artist: denial.of.service. Visit the video: [here](#) (Youtube).



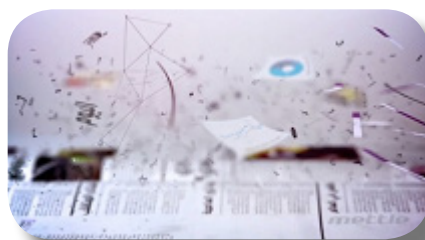
**07.** “Cubic Circles 360”. 360/VR Video created entirely in After Effects. FreeForm Pro (Mesh Warp + 3D shapes and clouds). SkyBox Studio (360/VR Production). Thanks to Ramiro AMK Fernandez for creating this. Visit the 360-video: [here](#) (Youtube).



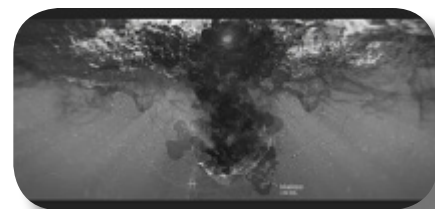
**08.** “Secret\_Science”. CG Artist Harry Martis used an unusual production pipeline for Secret\_Science, a music video for the Athens-based “drone’n’roll” band MECHANIMAL. His process started with a kinect 360 and ended up in After Effects with mettle’s FreeForm Pro plug-in. For his filmed material, Martis depended on an Xbox Kinect 360, which he then fed through the 3D image capture application, Brekel Kinect. For the remaining visuals, he turned to a concoction of Mettle FreeForm Pro, Meshlab, Vray for 3ds Max, Cebas thinkingParticles and Trapcode Form. Martis describes his visuals as “complexities of esoteric cyber microscopy via complex fractal formula explorations”. About FreeForm Pro, Harry says, “I have no words to describe what a pleasure it has been... the generator saved my life! And the terrains couldn’t have been made if it weren’t for FreeForm Pro (these shots would have taken weeks instead of hours...). I am utterly obliged and grateful.” Visit the video: [here](#) (Vimeo).



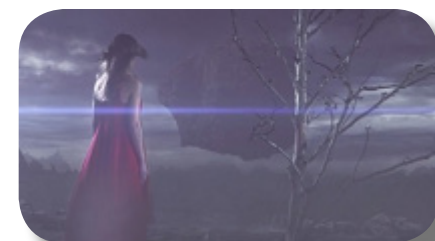
**09.** “Tabaat Al Mushahid - Title Sequence”. This title sequence for the Saudi morning newspaper review show, Tabaat Al Mushahid, shows a really practical use of FreeForm. The newspaper sequence was shot with a Canon 5D, with some blank areas left on the newspapers. The graphics were then added and peeled off/distorted in After Effects with mettle’s Mesh-Warp plug-in FreeForm. With some Plexus sprinkled in. “FreeForm was really easy to use. It has perfect integration into the After Effects UI. Also the fast rendering times make it easy to get just the look I want.” - Oz Smith. Visit the video: [here](#) (Vimeo).



- 10.** “Inkspllosion”. Claude Autret combines RodyPolis Ink Flow, FreeForm Pro and Trapcode plugins for this sequence. FreeForm Pro was used to create the water and terrain in After Effects, and to displace a moving point of impact across the terrain, in order to simulate the comet impact. Made in After Effects by Claude Autret. Visit the video: [here](#) (Vimeo).



- 11.** “Something Stronger by Origine”. As often happens, the turn-around time and budget were limited for this production. What to do? The model and band were shot on Greenscreen. All terrain and sky created and animated in After Effects with ShapeShifter AE and FreeForm Pro. A big shout-out to Tim Harris for a job well done. Visit the video: [here](#) (Vimeo).



- 12.** “Waves”. A conceptual video depicting the effects of sounds across our lifetime. Footage by Steve Langmanis, VFX by Chris Lavelle, who used FreeForm Pro as one of his main tools. Visit the video: [here](#) (Vimeo).

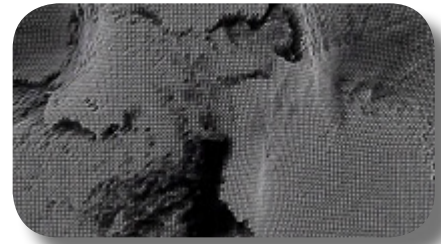


- 13.** “A Story of Hope”. Dave Legion and the amazing folks at Funky Medics put this together for the FH Foundation, in Adobe After Effects using Mettle’s FreeForm + MamoWorld’s Lip Sync. Great animation and a great cause. Check it out. Dave wants to send out a big thanks and shout out to Daniel Gies, whose work and tutorials inspired and helped him tremendously. Please help spread the word by sharing this link. Visit the video: [here](#) (Vimeo).





- 14.** “denial.of.service”. Created entirely in After Effects, using only FreeForm Pro. This video gives some insight into how Harry Martis (denial.of.service) creates his visuals in After Effects. He creates long segments, almost like a creative stream of consciousness. He then takes sections and further evolves them, to put into his final edit. Harry is known for his break-through work for clients, including David Bowie and BANKS. Visit the video: [here](#) (Vimeo).



- 15.** “What To Do With CO2”. Another great animation work by Daniel Gies from E\*D Films studio. This one tells the journey of a ginger-haired boy exploring the worlds of Carbon Dioxide. A 2012 Webby Nominee, commissioned and produced by the Science Alberta Foundation of Canada. Visit the video: [here](#) (Vimeo) or [here](#) (Youtube).



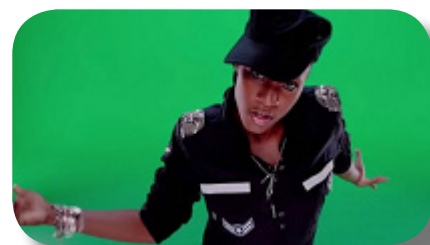
- 16.** “Evolution of Style”. Created by Morgan Préleur and the team at noside.fr. Mettle’s Freeform and FreeForm Pro handled all the clothes folding (shirts tearing apart, jacket wrapping, helmet transformation, etc). Morgan Preleur says, “Freeform really proved to be an incredible tool and allowed us to achieve complex 3D deformations under tight deadlines. FreeForm’s Pro’s ability to handle a lot of surface points while remaining totally interactive allows for a more creative and iterative process, we can experiment and come up with improved solutions which is crucial when speed is the key factor. It is a must have in our tool set.” Visit the video: [here](#) (Vimeo).







- 17.** “Evolution of Style 2”. Advertisement for Garnier hair products. All visual effects for this sequence were created entirely in After Effects, by Morgan Préleur and the team at noside.fr, using mettle’s FreeForm Pro and FreeForm V2 plug-in. Re:Flex was used for the body alignments and face morphing, while mettle’s FreeForm Pro handled all the clothes 3D morphing. Visit the video: [here](#) (Vimeo).



- 18.** “Beluga”. The journey of life seems bleak for a young boy, until a friend turns up in an unexpected place. Beluga is Ji Inn Jung’s graduation project, School of Visual Arts in NYC. The animation style was influenced by After Effects guru and Master illustrator Dan Gies. Ji Inn followed his character animation tutorials in After Effects using FreeForm Pro. Visit the video: [here](#) (Vimeo).



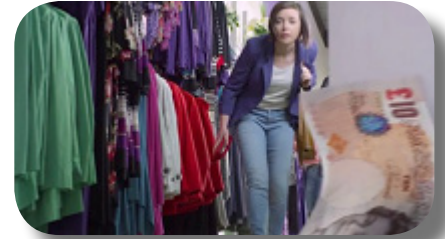
- 19.** “Tranceformed”. The Flower and The Sword. Two contrasting themes that come together very well in this motion graphics sequence by vj.nanographica (Tsukasa Kishimoto). Tsukasa wanted to express these traditional Japanese themes in a contemporary style. It’s created entirely in After Effects using mettle’s 3D plug-in FreeForm Pro. Visit the video: [here](#) (Vimeo).



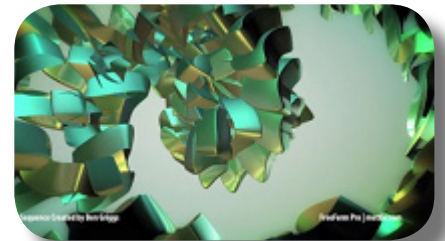
- 20.** “Virgin Media Ads”. Gareth Jones used FreeForm for this character animation for Virgin Media /Ignite. All done in Adobe After Effects. Visit the video: [here](#) (Vimeo).



- 21.** “Express Gifts”. Andy Galloway and the team at Chief Productions (UK) put this whimsical commercial together in Adobe After Effects. They used mettle’s 3D Plug-in FreeForm Pro to animate the British Pound jumping out of the wallet and running away. FreeForm Pro’s 3D mesh-warp feature makes it easy to do complex deformations in After Effects. Visit the video: [here](#) (Vimeo).



- 22.** “3D Morph”. This After Effects sequence was created by Ben Griggs ([vimeo.com/iclickstuff](#)), and tweaked by Chris Bobotis ([mettle.com](#)), with mettle FreeForm Pro, our 3D Plug-in for After Effects. The most prominent feature used is the “Generator”. Visit the video: [here](#) (Vimeo).



- 23.** “Time”. A music video by Chris Lavelle for Denature. Made with After Effects using Mettle’s 3D plug-in FreeForm Pro, Red Giant Software products, and C4D. Created by Chris Lavelle and his talented team in the UK, [ldistudios.com](#). Visit the video: [here](#) (Vimeo).

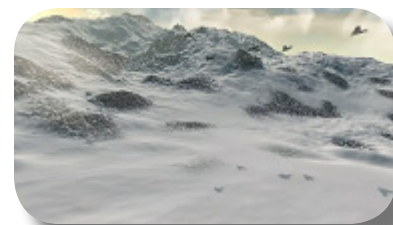


- 24.** “Sonic-Eye”. Sonic-eye is a technology that helps blind people see using echolocation, the same way that bats are able to maneuver in the dark at speeds of up to 30 mph. This After Effects animation illustrates the concept of the prototype. The wing animation, bending the shape in 3D space, was achieved with FreeForm Pro, which lets you bend and deform a layer in 3D space. The same results can also be achieved with FreeForm, our standard 3D Mesh Warp plug-in. The animation technique was inspired by Dan Gies’ character animation tutorial series. Thanks to Sky Jason Shields, Animator, motionographer, and video producer working primarily in After Effects and Cinema 4D. Visit the video: [here](#) (Vimeo).





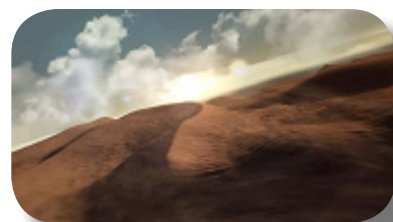
- 25.** “Snow Scapes”. One of the three Terra Packs from Mettle, for easily creating snow landscapes entirely within After Effects. Project files can be bought separately from FreeForm Pro. Created by the After Effects guru Patrick Larochelle. Visit the video: [here](#) (Vimeo).



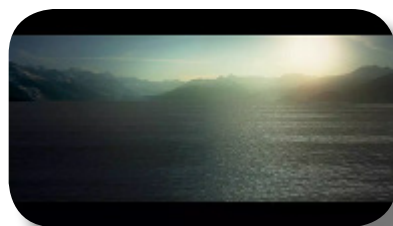
- 26.** “Lush Valleys”. One of the three Terra Packs from Mettle, for easily creating green valley landscapes entirely within After Effects. Project files can be bought separately from FreeForm Pro. Created by the After Effects guru Patrick Larochelle. Visit the video: [here](#) (Vimeo).



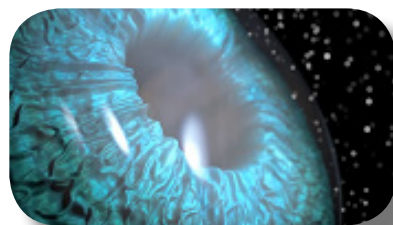
- 27.** “Lost Deserts”. One of the three Terra Packs from Mettle, for easily creating desert landscapes entirely within After Effects. Project files can be bought separately from FreeForm Pro. Created by the After Effects guru Patrick Larochelle. Visit the video: [here](#) (Vimeo).



- 28.** “Aqua Pack”. A series of AE project files from Mettle that lets you create aqua-scapes (water surface) easily entirely within After Effects. This pack can be bought separately from FreeForm Pro. Created by the artists Tudor Jelescu and Chris Bobotis. Visit the video: [here](#) (Vimeo).



- 29.** “Extreme Eye Close-up”. This beautiful artwork (when seen from afar) by Ran Ben Avraham is from the video tutorial at [tutsplus.com](#), showcasing the use of FreeForm Pro to create a detailed iris shape of the eye. Visit the video: [here](#) (Youtube).



- 30.** “Puppet Horseteeth”. Another beautiful animation by Daniel Gies, this time extracted from his character animation tutorial at DigitalTutors.com. Dan Gies uses FreeForm Pro and other smart tricks to bring this 2D painting into the third-dimension. Visit the video: [here](#) (part of E\*D Films showreel at Youtube).

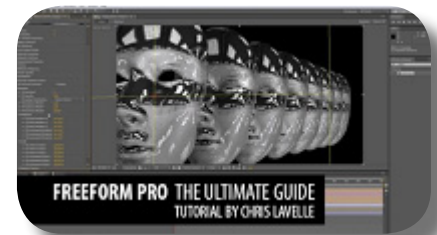


## FREEFORM PRO TUTORIALS NOOB TO PRO

Now let's get your feet really wet! Whether you're a newbie or an adept user of FreeForm Pro, these tutorials will get your 3D skills in After Effects blown through the roof! Select

from the list here skills you want to learn, and click the link to go to the on-line video tutorial. Now fire up After Effects and get FreeForm Pro ready on your PC!

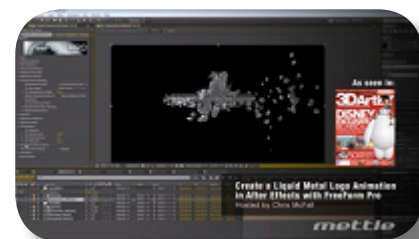
- 01.** “FreeForm Pro - The Ultimate Guide”. Watch the tutorial [here](#) or [here](#). Chris Lavelle walks us through the features of FreeForm Pro. He explains the general features, step-by-step. A thorough video manual that can be used as an introduction to FreeForm Pro. Chris Lavelle is an award-winning designer who works full time as lead graphic designer for Durham University, CEM. He's also a successful freelancer working under the guise of Ldistudios. His company creates logos, stings, VFX, websites etc. And if that's not enough, he is also a guest lecturer at Sunderland University, where he's a power user teaching After Effects in motion design, and Maya 3D.



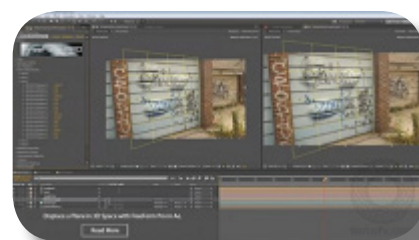




**02.** “Create a Liquid Metal Logo in After Effects”. Watch the tutorial [here](#) or [here](#). Featured in the November issue of 3D Artist Magazine! Chris McFall leads us through this amazing tutorial on how to create a liquid mercury logo animation all within After Effects. He uses mettle’s FreeForm Pro plug-in to nail the effect. Chris also shows us many clever uses with built-in Ae filters, as well as his finishing techniques.



**03.** “Dent A Garage Door VFX”. Watch the tutorial [here](#). In this tutorial, Effects artist Mike Sevigny shows us how to displace a plane in 3D space in Ae, making it look like a garage door is being deformed and dented. The process starts by using After Effects’ 3D camera tracker to track the live action shot. Mike then shows how you can use a projection to map the texture of the live action footage back onto a simple 2d plane which will represent the garage door. It is the use of displacement maps along with FreeForm Pro that will make it easy to animate the dents in the garage door, giving a convincing look to the effect.



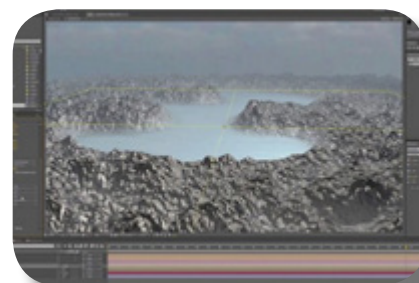
**04.** “Captain America Shield & Text”. Watch the tutorial [here](#). This After Effects sequence is created with mettle’s 3D plug-ins FreeForm Pro and ShapeShifter AE. The background rock is created using the Displacement Mapping feature of FreeForm Pro. The Captain America 3D text is created with ShapeShifter AE. The shield with FreeForm Pro. Finishing touches are added with RGS, Magic Bullet + Trapcode Suite Products.



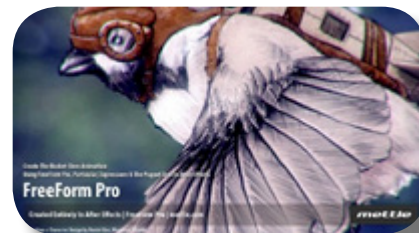
- 05.** “Lizard Man”. Watch the tutorial here: [Part 1](#), [Part 2](#), [Part 3](#), [Part 4](#), [Part 5](#), [Part 6](#). Ran Ben Avraham shows us how to create a Lizard Man transformation in After Effects with FreeForm Pro. Ran motion tracks a sequence and then he uses FreeForm Pro to wrap the texture of his choice around the actors face in 3D. In Part 1, learn how to do 3D track in After Effects and build your Kimodo Dragon texture with FreeForm Pro. In Part 2, you’ll learn 2D tracking in Mocha and apply the info to the texture. In Part 3, you’ll learn how to mask out the sections of the face that the texture should not apply to, such as the eyes and mouth. In Part 4, you’ll learn how to key out the green background and black shirt, and remove the tracking points from the face. In Part 5, you’ll learn how to create the Displacement Map. In Part 6, you’ll create the final Lizard Man transformation.



- 06.** “Create Terrain & Water in After Effects”. Watch the tutorial [here](#). Klaus Brandenburg explains how he created terrain and water from a layer in After Effects, using the FreeForm Pro Mesh Warp Plugin. He used some of the features introduced in Version 1.5 update to FreeForm Pro. Specifically, he covers Displacement Noise, Fog and Mist.



- 07.** “Rocket-Dees Tutorials”. Watch the tutorial here: [Part 1](#), [Part 2](#), [Part 3](#), [Part 4](#). Project files available at this [link](#). A thorough character animation tutorial by Daniel Gies, in which he covers FreeForm Pro, Trapcode Particular, AE Expressions, and the Puppet Tool. Perfect for a fundamental learning into FreeForm Pro character animation.

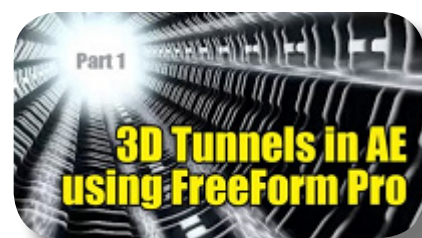




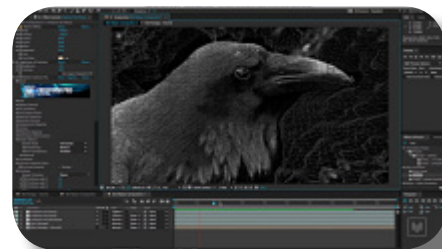
- 08.** “How to Create and Rig a Realistic Puppet”. Watch the tutorial [here](#). This is a huge series of tutorial by Daniel Gies. If you want to be proficient in After Effects puppeteering (character animation), this tutorial is the de facto standard! Another complete & thorough puppeteering tutorials by Dan Gies is available from Digital Tutors, although it is paid & premium; you can view it [here](#).



- 09.** “3D Tunnels in After Effects”. Watch the tutorial here: [Part 1](#), [Part 2](#). Tudor ‘Ted’ Jelescu explores the ability of the new FreeForm Pro plugin to create either organic-looking or blocky-hi-tech 3d tunnels in AE. Whether used for a scifi shot, a medical animated illustration or another fx shot, the tunnels created using FreeForm Pro give you the ability to move around them on the outside and fly inside.



- 10.** “Transform Footage into a Layered Mix of 3D Renders”. Watch the tutorial [here](#). A perfect tutorial to introduce you to the “Primitives” and “Render Options” features in FreeForm Pro. In this tutorial, you’ll explore how to transform a normal footage into a cool motion graphics piece.





# PART 2:

## DISSECTING ALL CONTROLS

In Part 2, we will discuss in great detail all features and controls of the FreeForm Pro plug-in. The tutorials in Chapter 2 teach you certain ways on how to achieve those particular end-results. Often, they'll teach you techniques not specific to FreeForm Pro; but in this Part 2 we will exclusively discuss FreeForm Pro in all its nook and cranny. So if you're wondering what's that "3D Transparency" control doing exactly, then this part is for you!





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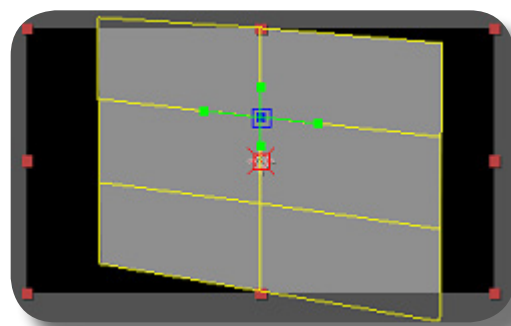
# CHAPTER 3:

## The “Grid” Group



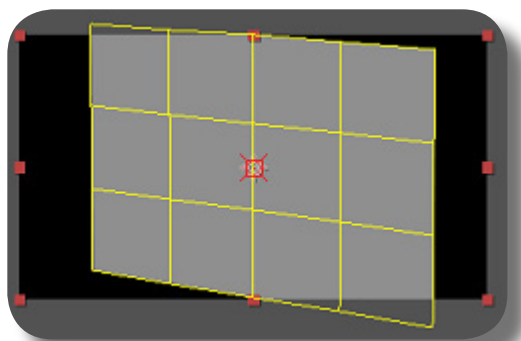
are used for smoothing the yellow lines once a vertex is moved. The vertex-tangent deformation is similar to the “Mesh Warp” effect: you decide how many Rows & Columns on this “Grid” group, and to deform the layer, you simply drag/move those tangents & vertices; but instead of working in the X and Y axis only, the vertices & tangents work in Z axis too. Once you have manipulated them, you can increase the number of Rows & Columns and your previous deformations will still be there. The resulting deformed layer can actually be viewed around using AE Camera and it will look actually 3D.

This group allows you to define the yellow grid on the Mesh. This yellow grid, with its tangents and vertices, allow you to deform your flat 2D layer into a 3D Mesh. A vertex (vertex point), is the point of intersection between two yellow lines; a selected vertex is shown as a blue rectangular dot. Tangents, or bezier handles, are the green lines emanating from the vertex point; tangents





## THE "ROWS" AND "COLUMNS" CONTROLS



The "Rows" controls how many yellow horizontal lines on the grid. The "Columns" controls how many yellow vertical lines on the grid. As seen in the picture, there are 3 rows and 4 columns, that is, 3 horizontal lines and 4 vertical lines.

## THE "MESH DISTORTION" CONTROL

As you can probably guess, this control is similar to the Mesh Warp/Liquify effects' "Distortion Mesh" control, where it is used for recording (thus animating) the Mesh distortions that you've done throughout-time using Vertex & Tangents. It can record well, even after you've changed

the number of Rows & Columns mid animation. To use this feature, turn ON the stopwatch-icon on this control. Any slight change you made on the Mesh (using vertex & tangents) is automatically recorded as a keyframe on the timeline.

## MOVING MULTIPLE VERTICES AT ONCE

If you have multiple vertices selected and you want to move them at the same time, you have to hold the Shift key while drag-

ging/moving them; otherwise, your selection will be lost and you only move a single vertex.



## FEW VERTICES FIRST, AND THEN INCREASE

A good workflow when deforming with vertices & tangents is that initially you want to set the number of Rows & Columns to something low/manageable for the general distortion, and only after you’ve completed the general distortion will you add more

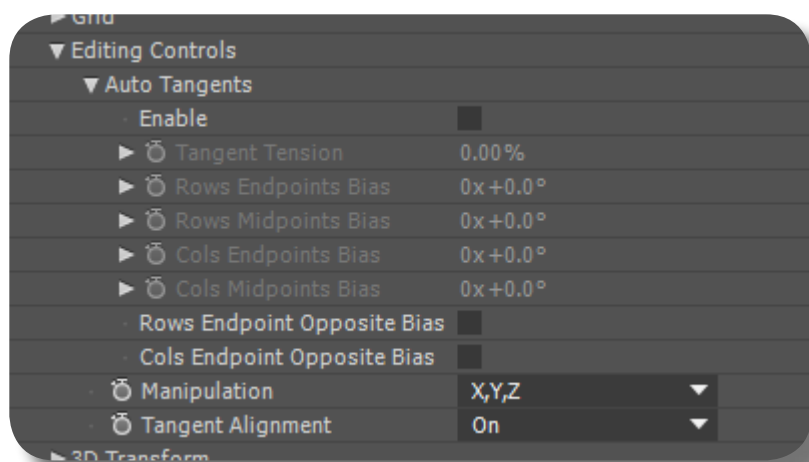
Rows & Columns for a more detailed distortion. This is important so that you don’t have to select & manipulate so many vertices from the beginning (for the general distortion).



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# CHAPTER 4:

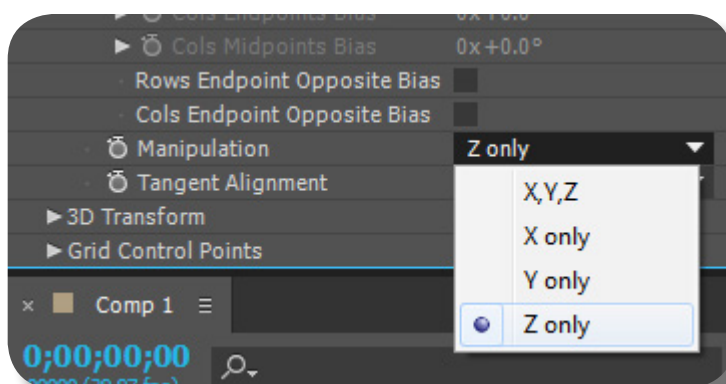
## The “Editing Controls” Group



This group is mostly about automatic tangent-manipulations, to create smoother deformations on the Mesh once vertices are moved. But the most useful feature is about constraining vertex/tangent movement in certain axis.

### MAKING THE VERTEX TO MOVE ONLY IN CERTAIN AXIS

Under this “Editing Controls” group -> “Manipulation” dropdown menu, you decide in what axis your tangent & vertex manipulation will happen, either in all XYZ axes, or Z only, Y only, etc; so when you drag/move the vertices from Comp Panel, they will only move on that designated axis, despite your mouse moving in all XYZ direction. This is mighty



useful if you want to create uniform or symmetrical deformations. Once you have moved a vertex in a certain axis, you can then change the “Manipulation” dropdown to other axis so you’re able to move it further on that other axis.

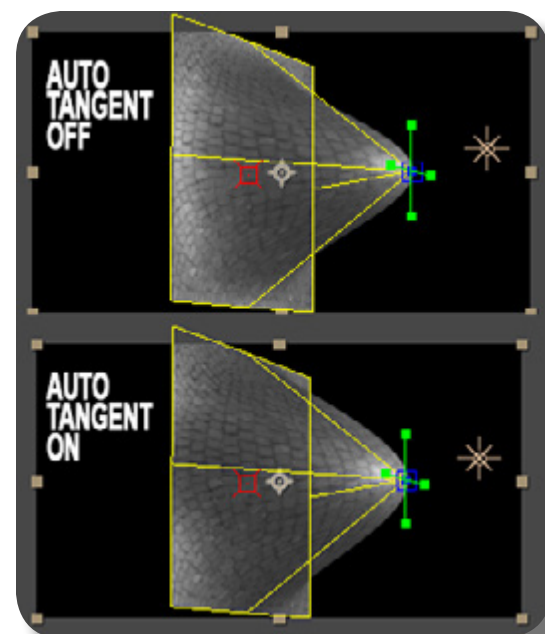
## BREAKING THE TANGENTS

Normally, the tangents can not be broken/moved individually, unlike in the Mesh Warp effect where you can use a keyboard shortcut to break the tangent, thus for example the left & right handles can be moved separately.

To do this in FreeForm Pro, you must set the dropdown “Tangent Alignment” to OFF (under this “Editing Controls” group), so that each tangents/handles can be moved individually.

## AUTO-ORIENTING THE TANGENTS FOR SMOOTHER DEFORMATION

Under this “Editing Controls” group, there’s a checkbox option “Auto Tangents.” Enabling this checkbox will let FreeForm Pro to automatically orient your tangents so that the mesh will have smoother deformation there (the tangents are made “auto-bezier”, so to speak). This checkbox applies to the whole mesh, so it’s not specific to the vertices you selected. But beware when turning this option ON you won’t be able to manually move your tangents, they will become “locked.” One quirk about Auto-Tangent is that after you turn it ON for vertices you have moved, and then you turn it OFF, those vertices will inherit their tangent orientation from Auto-Tangent, thus you can manipulate them further with this feature OFF; BUT ONCE you turn it ON again, those manual tangent manipulations that you did will be lost and they’ll become auto-oriented. So a good workflow is to use this feature only for the general distortion, and then when you want to get detailed & specific distortion, you turn this feature OFF for further vertices manipulation. See the picture for comparison between a Mesh with Auto Tangents OFF and ON.



## “AUTO-TANGENTS” CONTROLS

If you enable Auto Tangents as already mentioned, under the “Auto Tangents” sub group (under this “Editing Controls” group), you’ll have access to some controls there:

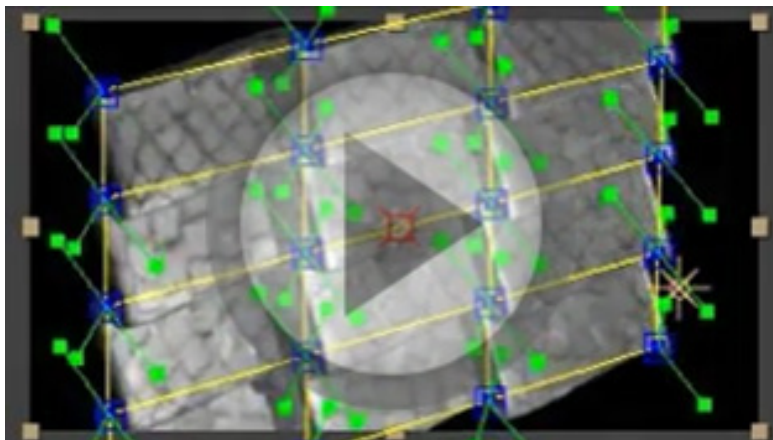
- 01.** Tangent Tension: this controls the length of ALL tangents on the Mesh, making them shorter or longer, essentially making some parts of the Mesh to contract while other parts expand, vice versa.
- 02.** Rows Endpoints Bias: this will rotate horizontally the “Row Tangents”, i.e tangents that are in line with the horizontal yellow lines, i.e parallel to rows. But only the “Row Tangents” that are located in the leftmost & rightmost yellow vertical lines of the Mesh, with the vertex point as the pivot for the rotation.
- 03.** Rows Midpoints Bias: this will rotate horizontally the “Row Tangents”, but only those located BETWEEN the leftmost & rightmost yellow vertical lines. The rotation direction is all uniform.
- 04.** Cols Endpoints Bias: this will rotate vertically the “Column Tangents”, i.e tangents that are parallel/in-line with the vertical yellow lines, but only the “Column Tangents” that are located on the uppermost & bottommost horizontal yellow lines.
- 05.** Cols Midpoints Bias: this will rotate vertically the “Column Tangents”, but only those located IN BETWEEN the uppermost & bottommost horizontal yellow lines. Rotation direction is all uniform.
- 06.** If you check the option “Rows Endpoint Opposite”, the horizontal rotation on the leftmost area is the opposite of the rightmost area, i.e clockwise vs counterclockwise.
- 07.** If you check the option “Cols Endpoint Opposite”, the vertical rotation on the uppermost area is the opposite of the bottommost area, i.e clockwise vs counterclockwise.





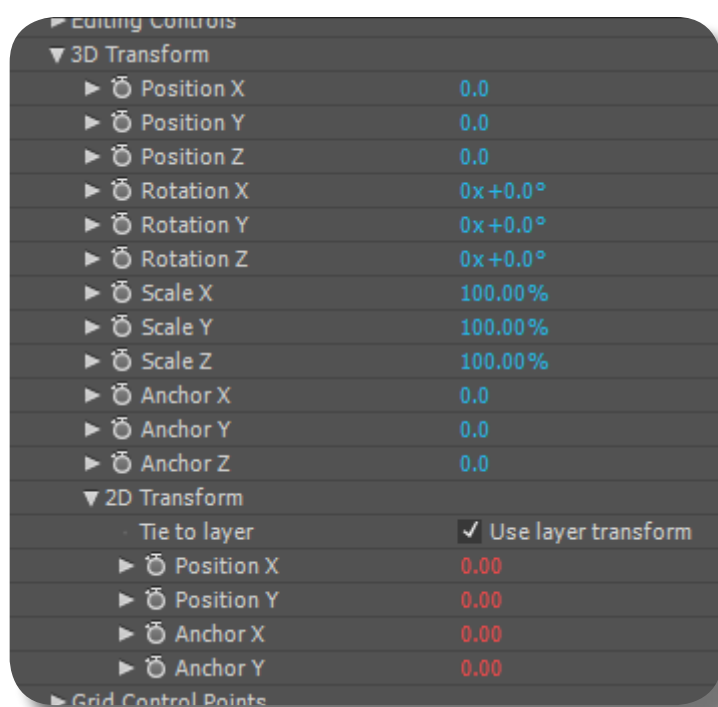
To give some ease to your brain when understanding the crazy nomenclature: "Row" or "Cols" of course refers to "Row Tangents" or "Column Tangents"; "Endpoints" refers to the head & tail of the horizontal/vertical yellow lines; "Midpoints" refers to the area in-between the head & tail of the horizontal/vertical yellow lines.

The result of all these rotations (since they're essentially rotating toward the Z axis) is undulating Mesh on the Z space, and manipulating these controls can achieve some cool looking visuals on your mesh, just be creative.



# CHAPTER 5:

## The “3D Transform” Group



Under this “3D Transform” group, you can do many transformations on your 3D mesh, including rotation, scale, position, anchor point, etc. Note that these transformations are different from moving your AE Camera, e.g you can rotate the camera to view the Mesh from different angle, but you can also rotate and move the actual Mesh itself using these controls. Most of the controls here are self-explanatory if you’re already familiar with standard layer transformations in After Effects.

### LOCAL AXIS ON THE 3D TRANSFORM

If you’re using this “3D Transform” group, remember that all transformations are done using the Mesh local axes, i.e if you change the orientation/facing of the Mesh (using the Rotation controls here), you’ll also change the orientation of the axes, thus for exam-

ple the Y-axis may not be the vertical/up-down axis anymore. The only exception is the Position controls, because it is still using the normal/global axis regardless of Mesh’s orientation. (Even Anchor Point controls are using the local axis).



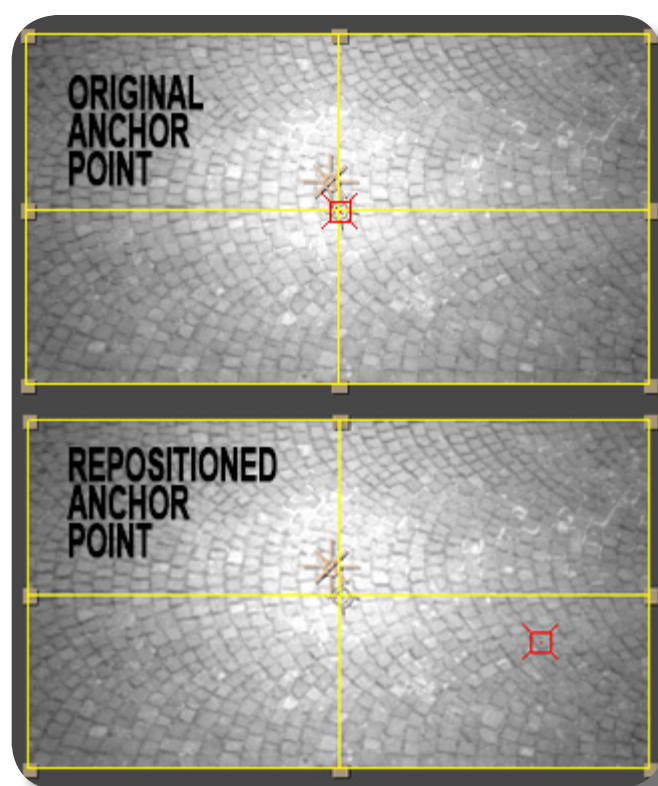
## REGARDING THE MESH ANCHOR POINT

If you manipulate the Mesh using its "3D Transform" controls, remember that the anchor point (pivot) where all transformations happen is no longer on the original 2D-layer's anchor point, but defined by the "Anchor X/Y/Z" controls on this "3D Transform" group. The Mesh anchor-point is represent-

ed by the red-box icon. Please note that the anchor point of each FreeForm Pro's mesh will always be placed initially at the very center of the composition (when the "Anchor X/Y/Z" controls are at 0,0,0 it means it's in the dead center of the composition).

## RELOCATING THE MESH ANCHOR POINT

If you want to move the Mesh's Anchor Point to a certain location on the Composition view, you can't just simply manipulate the "Anchor X/Y/Z" controls because instead of visually moving the anchor-point, it is visually moving the whole Mesh to accommodate for the re-location of the anchor-point, and the anchor point will seem apparently still/fixed. So to move the anchor point to a certain location, first of all you want to manipulate the "Position X/Y/Z" controls (or you can drag the red anchor-point box, it does the same thing i.e repositioning the whole mesh), so that the red anchor-point box is exactly on that custom location. But by moving the whole Mesh, the anchor-point position IN RELATION to the Mesh is still the same (because you're essentially moving the Mesh, not the anchor-point), so now to make ONLY the anchor-point move on that new location, simply copy paste the values on the "Position X/Y/Z" controls toward the "Anchor X/Y/Z" controls (so they both have the same value).

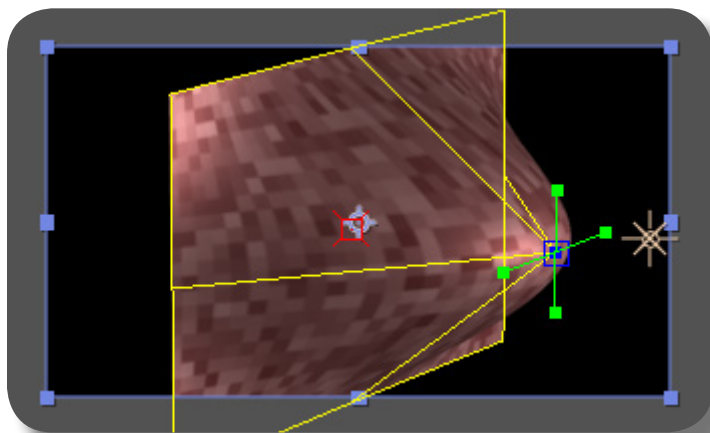


## CONTROLLING THE MESH ROTATION USING A NULL OBJECT

If you want to control the Mesh's Rotation using a Null object, you can tie (using Expression Pickwhip) each axes of the FreeForm's "Rotation X/Y/Z" controls toward each axes of the Null's object (of course the Null must be converted to 3D first). But first, do not ever forget to reposition the Mesh's anchor point toward the anchor point of the Null, using the methods just described before (you can also use AE's orthographic views to help you reposition the anchor-point in the 3D space). This way of controlling the Mesh using the Null's transformations allows you to parent AE objects (3D layers) toward the Null, so when you manipulate the Null's transformations, the FreeForm's

mesh & these AE objects will behave/move the same way as if they're one part. This is useful, for example, if due to one reason or another, you don't/can't integrate those AE Objects as a part of the FreeForm's mesh (for example, disconnected body parts yet moving as one, such as: the face & head is using FreeForm Mesh, but the tongue and teeth are separate objects yet moving as one with the face & head). Just make sure you test the Null's rotation in all axes to see if the objects & the mesh rotate the same way and there's no "floating" or offset distance once they are rotated (if there is such a problem, you need to adjust the Mesh's anchor point again).

## REGARDING THE 2D-LAYER THAT YOU APPLIED FFPRO TO



As you can see in the picture, despite having a true 3D-Mesh, your layer's bounding-box (purple rectangle) and standard transformations are all still 2D, i.e they don't even move a bit (and the bounding box still dab flat) even if you manipulate these "3D Transform" controls. Even if you rotate the actual AE Camera, the layer's bounding box will still be flat ortographic and not moved/rotated at all, only the inside pixels are manipulated in 3D.



## THE “2D TRANSFORM” GROUP (UNDER “3D TRANSFORM” GROUP)

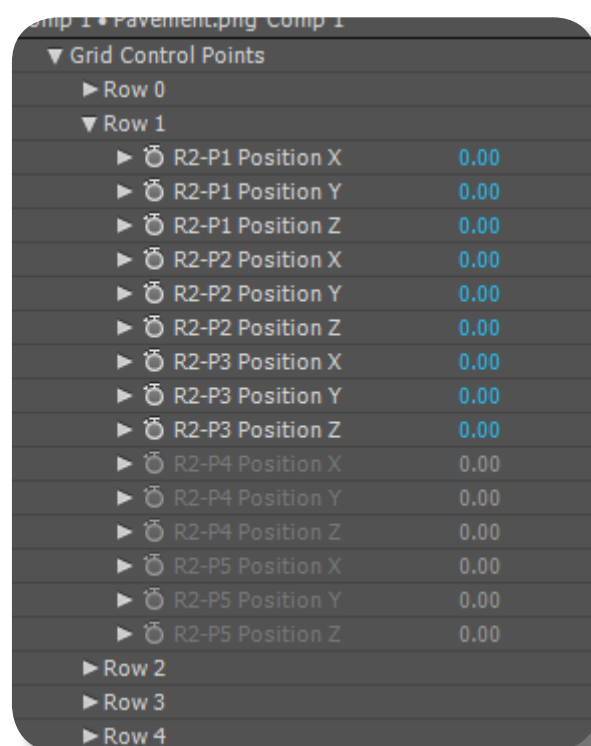
If you turn **ON** the checkbox “Tie to Layer”, which should be turned on by default, all the controls in this group (Position X/Y, and, Anchor X/Y) will be tied directly to the original layer’s Position and Anchor Point properties (i.e the 2D-layer that you applied FreeForm Pro to), thus you can’t manually manipulate these controls; you can only manipulate the original 2D-layer’s Position and Anchor Point properties. But if you **UN-CHECK** that checkbox, then you can have it both ways to edit the 2D positioning

& 2D anchor point of the Mesh: you can manipulate the original layer’s, and you can also edit using these controls; they’ll work in tandem. **BUT BEWARE** that manipulating either these controls or the 2D-layer’s properties will make the Red Anchor Point box (for using the 3D Transform) no longer relevant, because there’s now an offset distance between that Red Anchor Point box and the actual anchor point of the Mesh (the actual anchor point being no longer on the exact place where the Red Box is).

# CHAPTER 6:

## The “Grid Control Points” Group

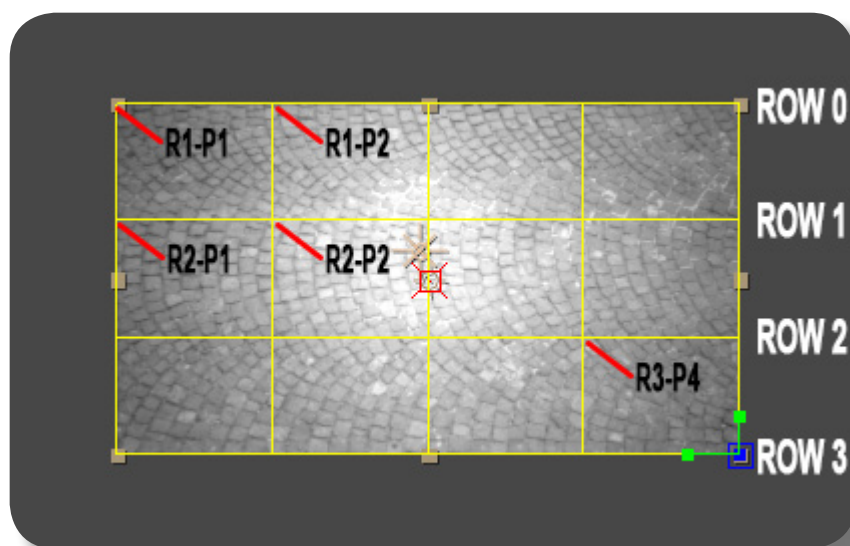
Under this “Grid Control Points” group, you can have access to the vertices’ values, i.e each vertex point’s exact X,Y,Z position. This allows for exact & precision manipulations of the vertex points, instead of moving & dragging them arbitrarily from the Comp view.



### HOW TO READ THE CONTROLS THERE

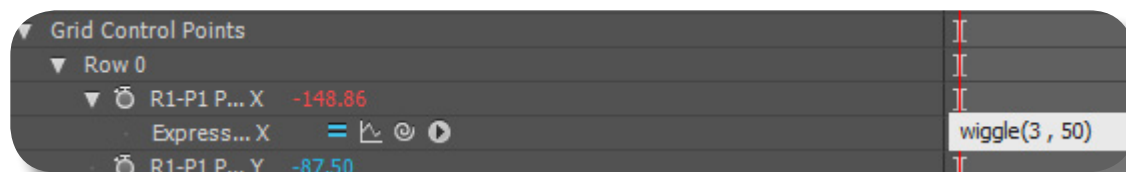
As you can see in the previous picture, the sub groups “Row 0, Row 1, Row 2” etc actually mean the yellow horizontal lines of the mesh. The topmost/first yellow horizontal line is called “Row 0”, the second horizontal line is “Row 1”, etc. And then inside each “Row”

sub group, you’ll see something like “R1-P1 Position X”, what that means: “R1” refers to Row number one, which means the first/top-most row, that is, it’s under “Row 0” group (I know, the nomenclature is inconsistent), and then P1 refers to Point number one, which



means the left-most vertex point on that horizontal line (Row is counted top to bottom, while Point is counted left to right). The word "Position X", "Position Y", etc is self explanatory. Unfortunately not all vertices are listed in this group, because it can only read up to Row 4, and Point 5; if you set the number of Rows & Columns to something high, there are vertices that can't be controlled here.

## CREATING UNDULATING MESH ANIMATION

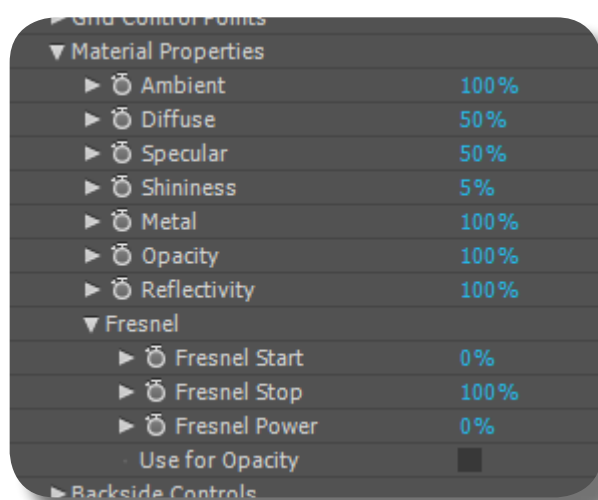


As you can see from the picture above, if you have a flat Mesh, you can apply the "wiggle" expression on each vertex point's X, Y, or especially Z Position property (from this "Grid Control Points" group), and you'll get a result like a cloth blowing in the wind or a rippling water on that mesh. You can also create a billowing tree in the wind by

making the tree "cross-sectioned" (the foliage consisted of two meshes intersected in the center creating what looks like a cross if viewed from above; or even more meshes; you can duplicate Meshes using the "Generator" feature which will be explained later), and the mesh is manipulated using this wiggle technique.

# CHAPTER 7:

## The “Material Properties” Group

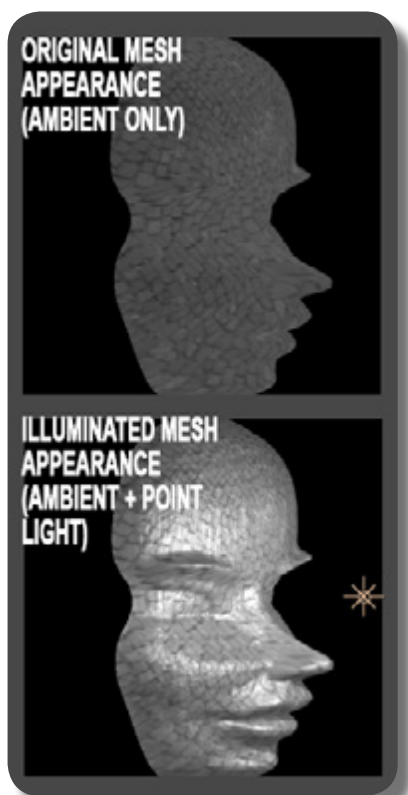


Under this “Material Properties” group, you can manipulate the layer’s surface material appearance such as its Shininess, Reflectivity, Ambient, Diffuse, etc, very similar to what you’d find in the default AE 3D layer (remember that a FreeForm Pro’s layer should not have its 3D switch enabled, thus not having the default Material Properties). The result for example, would be a shinier and more reflective 3D object to represent “metal”, or a drab surface to represent clay etc.





## AMBIENT CONTROL



This sets the original appearance of the Mesh layer when there is no light shining on it at all; think of it as After Effect's Ambient Light (a Light that is not a light). Lower value means the original appearance becomes darker, and a value at 100% means the image on the layer appears as it's originally created. If you have created an Ambient Light layer, both the Ambient Light's intensity & this Ambient material control will work in tandem to manipulate the layer's original appearance, i.e. they're mutually affecting each other's intensity: think of this Ambient material as the percentage multiplier of the Ambient Light's intensity, e.g. an Ambient Light's value of 200% and an Ambient Material value of 25% means "25%, or a quarter, of 200%" which equals 50%, which means the layer will appear as if Ambient Light is set to 50%. NOTE: if you have Lights in your scene but none is Ambient Light, this Ambient material will have no effect.

## DIFFUSE CONTROL



If Ambient material control is the percentage multiplier of Ambient Light's intensity, then "Diffuse" is the percentage multiplier for other types of light such as Point, Parallel, and Spot lights. So for example, even if a Point Light's intensity is strong, if you set this "Diffuse" control to low, the Mesh itself will only be slightly affected by that Point Light.

## SPECULAR CONTROL

This sets the layer's reflectivity of the Light objects; higher value means the layer will reflect the lights more, i.e. the shape (radius) and intensity of the Light object is reflected more on the layer, and a value of zero means it's not reflecting the Light's appearance at all (you can think of a light bulb's shape/radius and intensity being reflected on a mirror). You can see more clearly the light being reflected if you rotate the camera or move the Light objects.



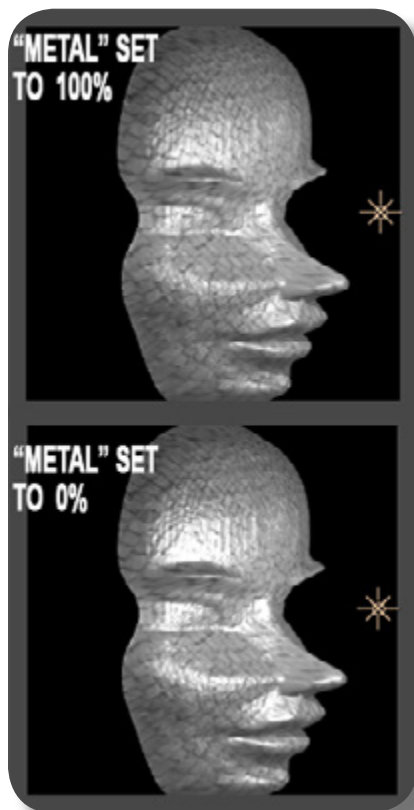
## SHININESS CONTROL

This sets the size of the "Specular" highlight above; higher setting means the Specular size is smaller, vice versa. A value of zero means the largest specular but also the edge is not feathered at all.





## METAL CONTROL



This sets the color of the Specular highlight, whether it's more the color of the layer, or, the color of the light source. A higher value means the specular highlight's color is closer to the layer's color, as if the specular is only playing with the brightness of an area of the layer (the shape/radius of the Light object). A lower value means the specular's color is closer toward the Light object's color that you have set, as if the specular is "washing out" the original color of a part of that layer and replacing it with the color of the light.

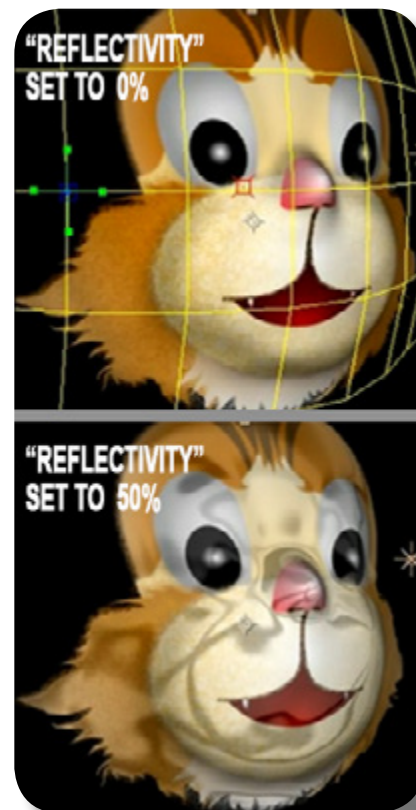
## OPACITY CONTROL



This controls, of course, the overall opacity/transparency of the Mesh. Unfortunately, this doesn't mean the Mesh is transparent toward itself, i.e. if you have a protrusion, you can't see through it to other area of the mesh behind the protrusion. This only affects transparency toward other 3D layers/object. If you want the Mesh to become transparent toward itself, you can set the "3D Transparency" control on the "Render options" group.

## REFLECTIVITY CONTROL

With this you can set the intensity of the Mesh reflection, but first you must define a Reflection Map layer under the "Reflection Mapping" group. Higher value here means the Reflection Map is shown even more clearly. If no Reflection Map layer is set, this control will do nothing.



## "FRESNEL" (UNDER "MATERIAL PROPERTIES" GROUP)

The Fresnel optical effect is about the way light is reflected on a reflective surface, such as water surface or shiny surface, and it concerns how steep your viewing angle toward the surface: if the angle of view is more perpendicular toward the surface (more toward top-bottom view), i.e. steeper angle, the reflection intensity on the surface is LESS, thus you can see more clearly the original texture of the surface and in case of water, you can see objects that are under water. But if angle of view is shallower, i.e. more parallel toward the surface, the reflection becomes stronger, and you can't see clearly the original texture of the surface, and in case of water, you can't see objects underwa-





ter. Inside of After Effects, you can think of your eye as the Camera object, and this Fresnel principle works normally no matter the camera position/distance in relation to the surface. So this is how this group works:

**01.** These Fresnel controls work in tandem with the "Reflection Mapping" group, and, the material property's "Reflectiv-

ity" control. So first of all, of course you must manipulate these two things to define the original reflectivity of the Mesh.

**02.** And then under the Fresnel group, you want to set the "Fresnel Start": this controls the viewing angle where the reflection begins to appear, in which higher percentage means the reflection already

starts to appear at steeper angle, and lower percentage means the reflection only begins to appear at a shallower angle.

**03.** The next two controls, "Fresnel Stop" and "Fresnel Power" define the feathering of the reflection edge. Let me explain: due to the nature of Fresnel phenomenon, at a certain viewing angle, you'll see your Mesh being divided in two areas, one area is where the reflection shows, and one area is where the original texture shows, i.e no reflection. Each of these areas gets bigger or smaller at the expense of the other area, depending on the viewing angle. And, being two separate areas that they are, you'll see the "boundary" or edge dividing these two areas. You can see this more clearly if you set the "Fresnel Stop" and "Fresnel Start" at the same percentage value. Thus to make a realistic appearance of the Fresnel effect, you need to "feather" this boundary. So, first of all, you need to set the "Fresnel Stop" at a HIGHER value than the "Fresnel Start"; if its lower value or same, no

feathering will happen. But setting the "Fresnel Stop" is not enough, you need to also set the "Fresnel Power": if "Fresnel Power" is at zero value, no matter how higher the "Fresnel Stop" is than the "Fresnel Start", there will still be no feathering, and the reverse is also true: no matter how high the "Fresnel Power" is, if the other two controls are at the same value, there is no feathering. Think of the "Fresnel Power" as the amplifier for the feathering, they work in tandem; BUT please keep in mind that the closer the "Fresnel Power" is to 0% or 1000%, i.e its maximum or minimum value, the feathering will also be smaller, so try to go for the middle percentage. Keep in mind that the MAXIMUM intensity of the reflection, i.e when the angle of viewing is at the shallowest, is defined from the material property's "Reflectivity" control; the intensity will be reduced by the feathering, when the angle of viewing is still too steep.



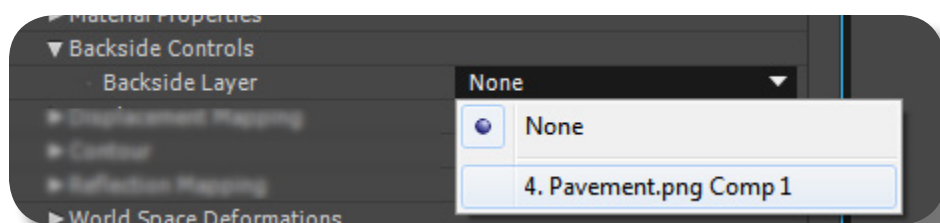
**04.** Finally, if you’re simulating the appearance of a water surface, as already explained before, you might want to turn ON the checkbox “Use For Opacity”; but first of all you must reduce the material property’s “Opacity”. Thus, the

Mesh area where the reflection is weak because you’re viewing from too steep an angle, that Mesh area is transparent; essentially, the weaker the reflection intensity the more transparent the Mesh becomes

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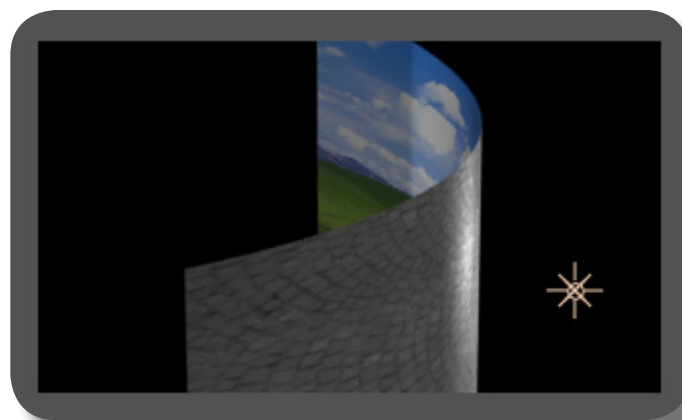
# CHAPTER 8:

## The “Backside Controls” Group



From this “Backside Controls” group, you can set a layer that will be applied to the backside area of your Mesh. Normally a FreeForm’s Mesh has backside appearance

exactly as the frontside, just like a normal 3D AE layer, i.e any image data you see from the frontside will also be seen from the backside too. If you set this control, the backside area will be filled by the image data of the layer you choose: the image data will appear flipped horizontally when you see the backside area of the mesh. If you choose a smaller-dimension layer, it will be stretched to conform to the Mesh’s size, ditto with larger-dimension layer, which will be shrunk; Alpha/transparency on the backside layer will make the Mesh’s backside to become perfect black on that alpha area, and the mesh is still opaque/solid when viewed from the backside, even though this black area will not react to light at all.

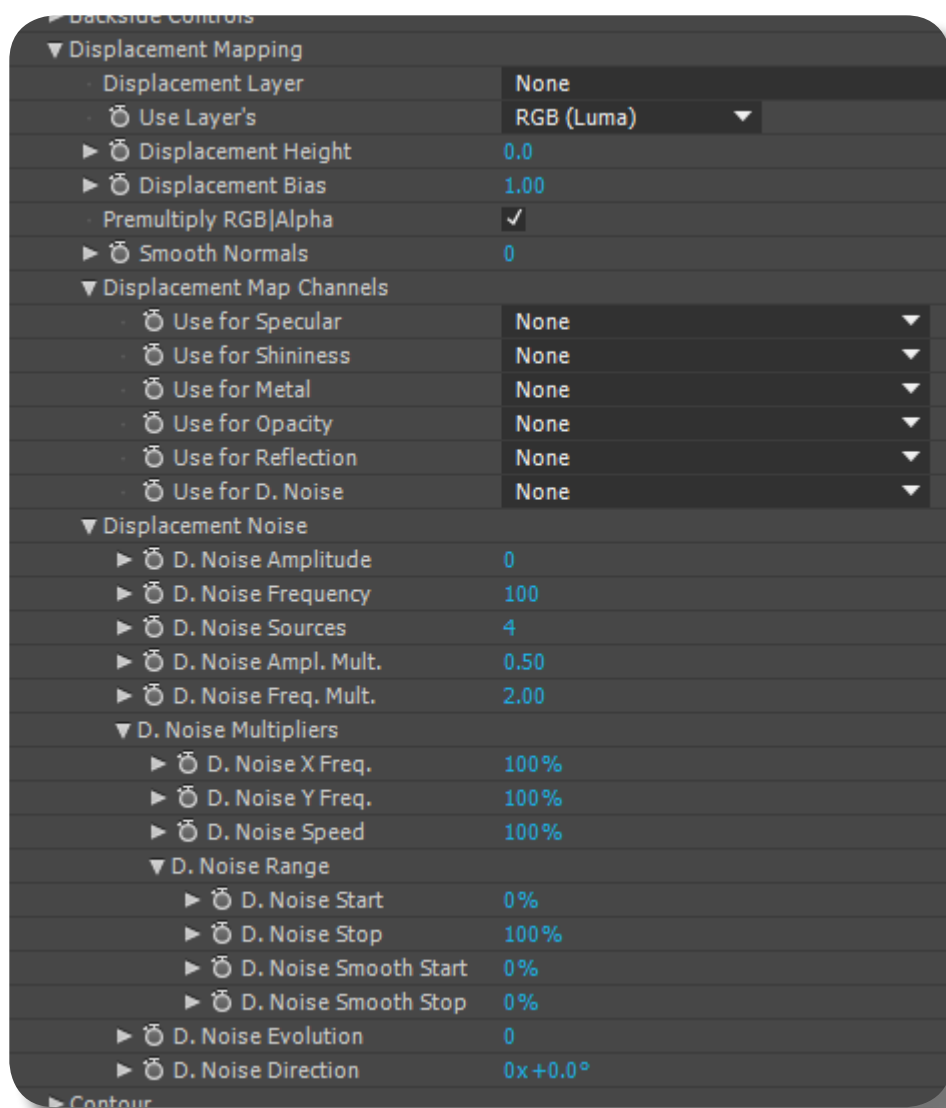


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# CHAPTER 9:

## The “Displacement Mapping” Group

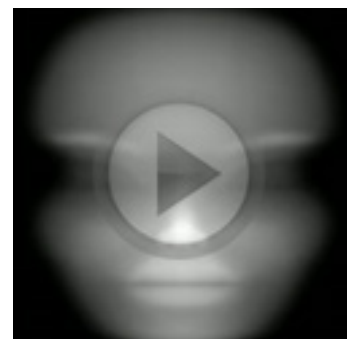


In this Chapter, we will thoroughly exhaust the topic of Displacement Mapping in FreeForm Pro, in-and-out, nook-and-cranny. This is one of the largest and most complicated control Groups there is in FreeForm Pro, as you can see from the picture here. This group deals primarily in three things: “sculpting” your 3D Mesh using Displacement Map image, isolating various material properties (as already described) to exist only on certain areas of the Mesh, and, creating organic-looking micro protrusions/undulations on your Mesh.



## WHAT IS DISPLACEMENT MAP?

Using vertex & tangent deformations are good for making the general 3D contour. But to get a more detailed 3D protrusions, you have to use a Displacement Map. With it, you can sort of create the protrusions by “sculpting”. Displacement Map is a layer that USUALLY contains black-white/grayscale image that defines how the Mesh is protruded & deformed: whiter/lighter areas mean the Mesh will have higher protrusion than the blacker/darker areas. See the picture here. The nose is the brightest area, thus the nose will have the highest protrusion than the rest of the Mesh. Of course a Displacement Map image does not have to be grayscale/black-white, it can be any color containing the R/G/B values, but we will discuss this later.



## CREATING DISPLACEMENT MAP

You can create a Displacement Map image by various means: by painting using the Brush tool in Photoshop, or directly inside After Effects using AE Brush tool, Shape Layers, gradient/ramp effects, etc etc; in essence, anything that you can utilize to paint a black-white/

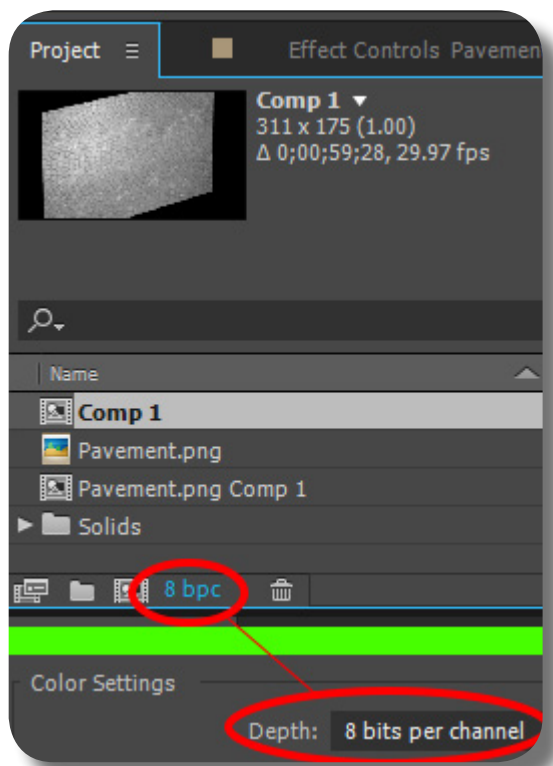
grayscale image will do. But when you’re painting a Displacement Map for use with FreeForm Pro, make sure that it’s quite soft & blurry, not sharp & detailed because it will result in jagged or sharp-edged 3D mesh.

## BASICS OF USING THE DISPLACEMENT MAPPING FEATURE

So you go to this “Displacement Mapping” group, and under “Displacement Layer” you set which layer contains the displacement map image. If you’re using grayscale/black-white image, under “Use Layer’s” make sure you set “RGB (Luma)”. And then you bump up the “Displacement Height” control to actually see the 3D protrusions appearing. Beware though, if the image contains high-contrast area between black and white, it will create a very sharp/harsh edge on the 3D mesh. One way you can solve it is by blurring the displacement map image; simply use generic

blurring effects such as Gaussian or Fast Blur, etc. When you do the blurring, you should not look at the actual displacement map image, because it will seem you’re doing too much blur; but instead look at the actual 3D mesh (preferably in angled Camera view) so you get the actual result of how smooth the 3D mesh has become. Blurring a displacement map image is a very important step, because even with digital painting in Photoshop using tablet & stylus, the displacement image will still result in jagged/too sharp 3D mesh.

## COLOR BIT-DEPTH WHEN USING A DISPLACEMENT MAP



When using the Displacement Mapping feature, make sure your Project Setting's color depth is set to 16-bit or higher (from the menu File -> Project Settings, look under the “Color Settings” field). If it's 8-bit, the grayscale image will have apparent “banding” (rough transitions) between blacker & whiter areas, thus creating a mesh that's not really smooth. An easy way for you to change the bit-depth without going to File menu, is to simply click the button at the bottom of the Project Panel that says “8 bpc”, and then the Project Settings dialogue will appear. Or, even quicker, you can press the ALT key while clicking that button to cycle between 8, 16, and 32 bpc quickly. AE's default depth is set at 8 bpc.

## APPLYING CHANGES/EFFECTS TO THE DISPLACEMENT MAP LAYER

Any Effects or changes you applied to the Displacement Map layer will not be recognized by FreeForm Pro, it will only recognize the original (virgin) form of the layer. So if you need to apply effects, such as blurring, etc, make sure you do it on the root layer,

which means the Displacement Map layer is Precomposed. FreeForm Pro will ALWAYS read the virgin form of the layer, even if you apply basic transformations such as scale, rotation, etc it won't be recognized, ditto with Paint effect.



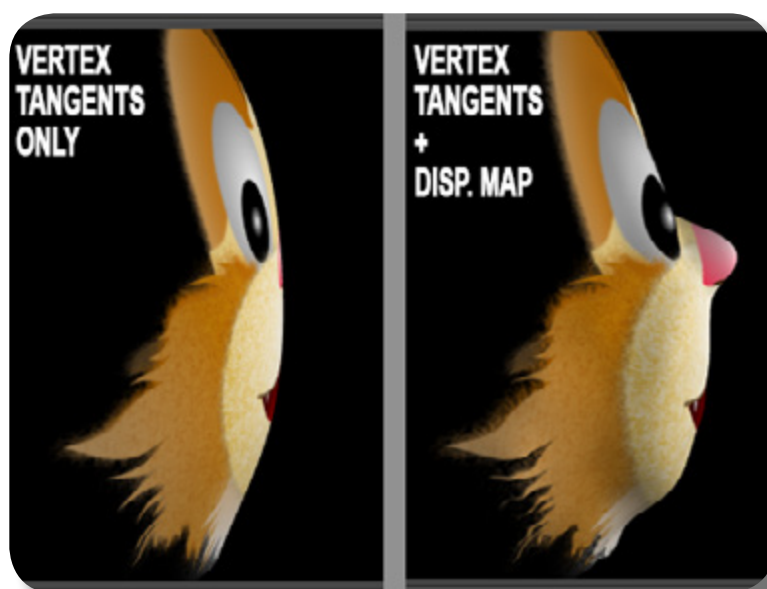
## PRECOMP AS A DISPLACEMENT MAP LAYER

Precomposing a Displacement Map layer is not only useful when you need to apply changes to it, but when you have multiple layers that comprise the Displacement Map image as a whole. But please note when using Precomp, the Precomp's background color doesn't do anything in terms of Displacement Map data, because essentially it's just alpha (transparency) no matter what color you choose. So for example, as seen in the picture you set the Precomp's background color to light-red, it won't make the mesh protruded on those light-red Alpha area. On a side note, please remember that if a Displacement Map image contains Alpha/transparency, the 3D Mesh itself will be eaten/cut-out on that Alpha area (you can change this behaviour using "Alpha Threshold" control, which will be explained in a later Chapter).



## USING BOTH VERTEX-TANGENT AND DISPLACEMENT MAP

Once you have applied mesh deformations using vertices & tangents, you can actually apply Displacement Map to that already deformed mesh, and the deformation caused by the Displacement Map will not replace the deformation caused by vertices & tangents, but rather adding to it. Thus if you already have a bulging/protruding Mesh, and then you apply Displacement Map, the result is an even more protrusion on the Mesh; the Displacement Map merely acts as if it's protruding from a normal flat Mesh, i.e. if you set the "Displacement Height" control to zero, the protrusion is still from the original vertices & tangents



manipulation, but once you set higher value on that control, the Displacement Map will start protruding the area even more. So there is a possibility that whiter/lighter areas on a Displacement Map may actually have lower

protrusion than the blacker/darker areas, that is if the original vertex/tangent manipulation has more protrusion on the blacker/darker areas.

Please note when you do this (using both vertex/tangent & Displacement Map), FreeForm Pro will extract the image data of that Displacement Map layer and then deform that image data the same way as the mesh (with the protrusions and all), essentially moving & stretching the B/W-grayscale data, so when

you start cranking up the “Displacement Height” control, you’ll see that the protrusion (from this “conformed/deformed” Displacement Map image) may no longer be on the exact same place as the original flat Displacement Map image.

## USING A LAYER OF SMALLER DIMENSION AS THE DISPLACEMENT MAP

If the Displacement Map layer has a smaller dimension than the Mesh layer, then this smaller-dimension Displacement Map layer will be stretched out to cover the same area as the Mesh layer (the grayscale/BW image data is stretched out). Layer dimension in this

case is calculated from the layer’s bounding box, not from the alpha. The same thing applies to a Displacement Map layer that has larger dimension (which will be shrunk to the Mesh layer’s dimension).

## ANIMATABLE DISPLACEMENT MAP IMAGE

The beauty with FreeForm Pro’s Displacement Map is that when the grayscale/BW image is changed/animated, the 3D Mesh will automatically conform to it, on the fly. This can be useful for a variety of things, for example if you’re doing character animation and you want to have a body part that protrudes & shrinks in 3D space (the eyes or cheeks, for example). To do this, inside the Displacement Map Precomp, you can create a white Solid layer that is masked to conform to the shape of that body part/appendage, and the Solid’s mask is heavily feathered too so it won’t





create sharp/jagged mesh, and then you animate (keyframe) the Solid layer’s **OPACITY** to make the white color less or more intense, so the body part appears to bulge & shrink.

## THE “DISPLACEMENT BIAS” CONTROL

This control has a default value of 1, and reducing it will recede the entire mesh away while still retaining the “Displacement Height” protrusion relative to the receding

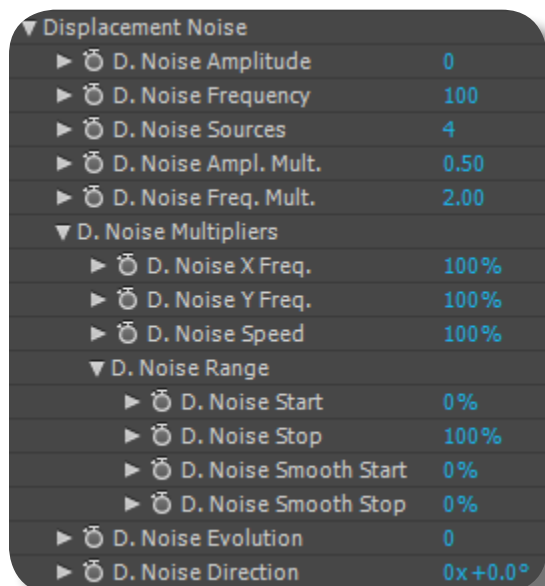
mesh (i.e the entire Mesh with its protrusions are not shrunk or made smaller, only receding away backward from where the protrusion direction is).

## USING R/G/B CHANNEL VALUE FOR THE DISPLACEMENT MAP

Remember that instead of using “RGB (Luma)” value (i.e BW/Grayscale) on your Displacement Map data, you can use each of the R, G, or B channels. This is useful if your Displacement Map image is created using one of those channel colors, i.e not the normal grayscale/black-white. When doing that, please remember that any pure black will also be interpreted as the lowest elevation (flat). For example, when you use the “Red” channel, you can see it from the “Info Panel” (by hovering your mouse over the

image), any pixels containing an “R” (red) value of zero will be treated as zero elevation/flat, and any increase on the R value means increased elevation too, it doesn’t care about other channels’ value. **NOTE:** instead of using the Info Panel to read the elevation, you can use the “RGBa” button (at the bottom of Comp Panel) to actually view that specific channel in black-white imagery: as usual, whiter areas mean higher elevation, and darker areas mean lower elevation.

## CREATING ORGANIC BUMPS & UNDULATIONS USING “DISPLACEMENT NOISE”



Under the “Displacement Noise” group (which is under this “Displacement Mapping” group), you can apply random noise to the Displacement Map data, essentially making random undulations on the Mesh. You can tweak all these settings to achieve some amazing organic mesh deformations or animation, such as rippling water or waves, fluttering flag/cloth, bumpy/scaly skin texture, etc. The settings are:

**01.** D. Noise Amplitude: Sets how “deep/high” the undulation is, i.e in relation to the flat Mesh. Please note that setting

this control to zero will make all subsequent controls to have no effect whatsoever.

**02.** D. Noise Frequency: Sets how much noise there are in the Mesh, thus how many undulations.

**03.** D. Noise Sources: This will control the details of the noise, i.e its crumpleness or minutae/higher frequency noise.

You can have full control over how the minutae noise appears, using the two controls explained next.

**04.** D. Noise Ampl. Mult.: this controls the depth/height of the “Source” noise, i.e the high-frequency/minutae noise. If you set the “Source” control to a val-

ue of one, this Amplitude Multiplier and Frequency Multiplier will have no effect on the mesh.

**05.** D. Noise Freq. Mult.: this controls the amount (how much) of the higher-frequency noise.

**06.** D. Noise X Freq.: this controls how many undulations, but based on the horizontal/left-right axis of the Mesh. New undulations will be created from the left & right edges of the mesh and moved/compressed/crowded toward the center. If you set the “D. Noise Y Freq.” to zero, you’ll see that new undulations

from this “D. Noise X Freq” appear as waves spanning perfectly along the vertical length of the mesh; only when you increase the “D. Noise Y Freq.” will the vertical span is interfered by new waves emanating from the top & bottom edges of the mesh (horizontal waves).

**07.** D. Noise Y Freq: similar to the previous control, but the new undulation/waves

are created from the top & bottom edges of the Mesh (thus horizontal waves).

**08.** D. Noise Evolution: this will move/animate the noise undulations along the Mesh. You can keyframe this control to

make an animation of the undulations moving. Higher value here means a greater “distance” of the movement.

**09.** D. Noise Speed: this will set the movement speed of the undulations, i.e if you set keyframes on the “Noise Evolution” control already. Another way to define

speed, is to make the Evolution keyframes closer/further from each other on the Timeline.

**10.** D. Noise Direction: this controls the direction of the moving undulations.

**11.** D. Noise Range controls: These controls define how much an area of the mesh is free from all the noises/undulations, and in defining this area you can decide either ALL or NONE of the Mesh is free from the noise/undulations, OR, ANY

area within the NON-PURE-BLACK area of the Displacement Map data. The “Smooth” controls there will smoothout the jagged mesh at the edge of that defined area.

**12.** Important Note: noise will also affect & deform the original protrusions from the Displacement Map, but please note that once the noise undulations are animated/moved using the Evolution controls, the original Displacement Map protrusions

will not move along with it, because of course it’s NOT NOISE. Think of the original protrusions as the “terrain contour” where the Noise is “attached to”.

## SMOOTHING OUT THE NOISE

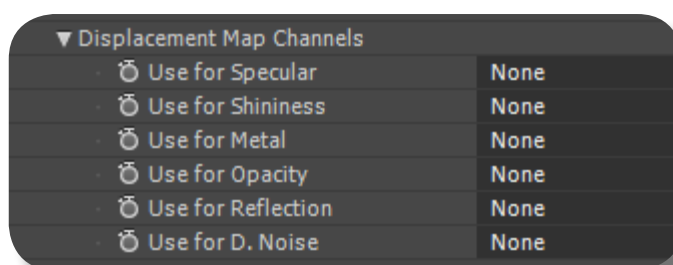
Under this “Displacement Mapping” group there’s this “Smooth Normals” control: higher value in this control means smoother

mesh with less noise. This doesn’t affect the original protrusion from the Displacement Map image data.

## RESTRICTING THE “DISPLACEMENT NOISE” ON CERTAIN AREAS

Under the “Displacement Map Channels” group, there’s a dropdown menu “Use for D. Noise”; you can use this to restrict the area that contains noise/undulations to specific R/G/B channel. For example, you choose the “Red” channel on this dropdown, then all noise will only happen on

the Displacement Map image area that contains Red channel data (ANY NON-ZERO “R” value on the Info Panel); the closer the pixel data toward pure Red, the stronger the noise will be, vice versa. If you choose “Red Inverted”, the inverse will happen, i.e noise will happen in all areas NOT HAVING PURE RED: only the Pure Red area will be free from noise, even areas that have Red pixel value but not full/pure enough will have noises in them; the closer it is toward full/pure red, the less noise strength. NOTE: full/pure Red means the strength of the “R” on the Info Panel is at maximum value (i.e either 100%, 1.0, or 255 depending on your Info Panel setting), regardless



of other channels’ value. All this explanation applies to other channels as well. Also please note that the channel you use as the Displacement Map data (normal protrusions), and, this Displacement Noise Channel, are completely separate, i.e you can use the RGB (Luma) or even Red channel as the Displacement Map data, but use a Blue channel as the Displacement Noise Channel; the Displacement Noise Channel always extracts the original RGB data from the Displacement Map image. This technique can be used, for example, to create a rippling water in one area and a stable stone protrusion/cliff in another area, all in the same Mesh.

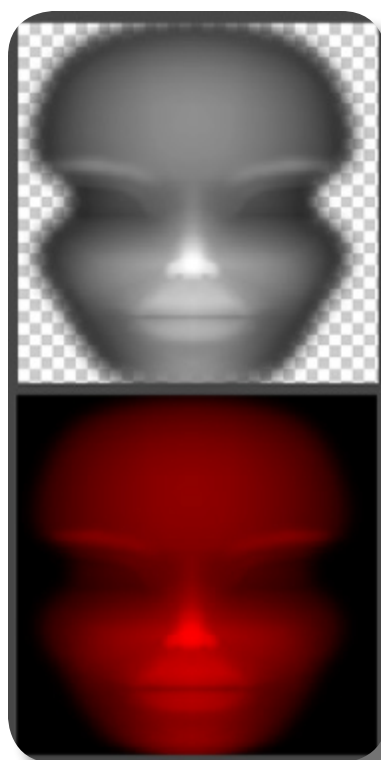


## RESTRICTING THE MESH MATERIAL PROPERTIES ON CERTAIN AREAS

Similar in function to the previous section (isolating "Displacement Noise"), you can also isolate certain material properties to a certain channel that you choose, by using the other controls under that "Displacement Map Channels" group. For example, you want to isolate the reflective area of the mesh to happen only on the Blue channel area of the Displacement Map layer, then you must go to the dropdown "Use For Reflection" and set it to Blue, thus the rest of the mesh is not reflective. Other dropdowns include "Use For Specular", "Use For Shininess", "Use For Metal", and "Use For Opacity", and all these of course correspond to

the controls under the "Material Properties" group as you already know. If you set one of the controls here to NONE, the corresponding Material Property is no longer isolated but applied to the whole mesh. As described previously in the "Use for Displacement Noise", channel areas that are not full/pure, i.e. lower channel value (on the Info Panel) will mean lower strength of that particular Material Property, etc. Important NOTE: remember that you can always set the "Displacement Height" control to zero, if all you want from the Displacement Map layer is for isolating these things and not to produce terrain contour/protrusion on the mesh.

## CONVERTING THE GRAYSCALE IMAGE INTO AN R/G/B IMAGE



If you only have a blackwhite/luma/grayscale Displacement Map image, but due to one reason or another you want to use another channel, such as Red, or Green, etc, you can do so! But not by simply changing the "Use Layer's" control to that channel, because you only have a grayscale image data thus the displacement contour will not be correct. So what you can do is using a Solid layer: for example, you want to use the Red channel for the Displacement Map data; so, you create a Solid layer colored with pure/full Red, and place this Solid on top of the original grayscale Displacement Map layer. And then change the Solid's blending mode to MULTIPLY. And of course, do not forget to Precomp the two layers and use the resulting Precomp as the Displacement Map layer. Now you can see that despite using the Red channel, the contour/protrusion is as correct as the original grayscale Displacement Map data. But how can you make a color that is pure/perfect Blue or Red or Green? Easy: on the color picker dialogue box,



look at the three R-G-B buttons/controls; if you want a pure color, input the value 255 on that particular channel (or input a value of 1.0, if in the Info Panel you changed the display to “Decimal”), regardless of the value on other channels (but preferably you want to make the other channels zero). **IMPORTANT NOTE:** if the original grayscale Displacement Map layer has alpha/transparency, this alpha will become tinted with the Solid’s color, thus might be protruded. So to make it black, apply a black Solid Layer and place it **BELOW** the grayscale layer. Also, if you need to increase or decrease the R/G/B strength of that Color (the Solid’s color), you only need to increase/decrease the Opacity of the original grayscale layer.

## HOW TO ISOLATE MATERIAL PROPERTIES ON CERTAIN AREA IF YOU ONLY HAVE GRAYSCALE DISPLACEMENT MAP

This is a possible situation that you may encounter; that is, you already have a good black-white/grayscale Displacement Map image, but you want to isolate certain material property such as Reflection to certain area of the Mesh, for example to the eyes only as seen on the picture here. Here are the steps:

- 01.** Assuming you already have a grayscale Displacement Map, let’s convert this into a certain RGB color. For example let us change it to Red, then use either the “Shift Channels” effect, or, the Solid layer method (as already described) to convert the BW Image into that specific RGB color. If you use “Shift Channels”, make sure to apply the effect on a Precomp or an Adjustment layer so it encompasses the whole Displacement Image (if the Displacement Map consists of multiple layers); from that Effect’s controls panel, simply set the “Take Red From” to either “Luminance” or “Red”, and then set “Full Off” on both “Take Green From” and “Take Blue From” controls.



**02.** Now that you have the Displacement Map converted to a certain RGB color, obviously you must tell FreeForm Pro to use the “Red Channel” for the Displacement Map data. Believe me, there’s

**03.** Now of course you must set the Material property that you want (using the “Material Properties” group); for exam-

**04.** Go inside the Displacement Map pre-comp, and create the “isolation shape” layer, i.e for isolating the reflection, using any tools either Shape Layers, Brush, etc THAT HAS A COLOR VALUE OF PURE-GREEN (or PURE-BLUE); you already know how to achieve such pure color. For example if you want to iso-

**05.** Once the “isolation layer” is created, place it above the actual Displacement Map image, i.e the Red imagery. And then the MOST IMPORTANT step: SET the “ISOLATION LAYER’S” BLENDING MODE to “ADD”. This way, when you hover your cursor over the imagery, you can see on the Info Panel that BOTH the Red Channel AND the Green Channel are FULLY represented there;

**06.** Obviously, now go to the “Displacement Map Channels” group, and set “Use for Reflection” to “Green” (or any Material property you want to isolate). Now you

NOT A SLIGHTEST difference in Protrusion from the previous “RGB (Luma)” channel when we were using BW/gray-scale image.

ple the Reflection Map layer and its corresponding settings, so the Mesh now has reflections on the whole area.

late according to the shape of the eyes, then draw a shape of the eyes (filled with that pure color). Remember that this shape does not need to be blurred or conforming the actual Displacement Map data IN ANY WAY; this shape is for ISOLATING the Material Property, NOT for generating Protrusion.

the Red Channel’s value being unaffected at all by the Isolation Layer’s color. If you don’t believe me, just lock a Comp panel to show the actual 3D Mesh, and then go inside the Displacement Map Precomp to turn ON/OFF the Isolation Layer’s visibility switch, and see that the actual 3D Mesh protrusion does not change in any way!

can see that the reflection is contained & isolated perfectly conforming to that Isolation shape that you’ve drawn.

**07.** IN SUMMARY, there are two key steps here: FIRST, converting your BW/grayscale Displacement Map to a certain RGB color and tell FFPRO to use that channel; SECOND, set the “isolation layer’s” Blending Mode to ADD. NOTE: You may ask, why don’t we use the usual “RGB (Luma)” channel, i.e. the usual grayscale image? Answer: because grayscale Image, i.e. Luminance value, contains ALL RGB CHANNELS AT ONCE, ALL AT THE SAME STRENGTH; and as you already know, if we set it as “RGB (Luma)” while in reality the Disp Map itself has some imbalanced RGB composition due to the Isolation layer, then the Protrusion will not be as what it used to be.



## THERE IS NO DEPRESSION/VALLEY LOWER THAN PURE BLACK

Remember that you can’t make a “valley” on an already pure black area of the Displacement Map, because there is no channel value lower than pure black. If you want to create a valley, first you must raise your

mesh, which means you must use a lighter color as the base of the Displacement Map image, and then you can apply darker colors to create the valley.

## DISPLACING YOUR LAYER WITHOUT DISPLACEMENT MAP LAYER

If you don’t set any Displacement Map layer for your Mesh but increase the “Displacement Height” control anyway, FreeForm Pro will use the alpha value (i.e. transparency value) of the original layer to define the contour (disregarding the setting in the “User Layer’s” dropdown, even if you set it to RGB/Luma and not Alpha). As usual, you can see the Alpha value from the Info Panel. The lower the alpha value, the lower the elevation (and vice versa if you use a negative

value in the “Displacement Height” control). Also, in the “Alpha Threshold” control of the “Contour” group, instead of eating your Mesh based on the Alpha of the Displacement Map layer, it will eat your Mesh based on the Alpha of the original Mesh layer. If there’s no difference in the Alpha value (i.e. the whole layer has a uniform Alpha value), the Mesh is merely moved up or down in its entirety.



## AUTO-CONFORMING DISPLACEMENT MAP FOR CHARACTER ANIMATION

When doing character animation, you have to make the Displacement Map layer to automatically “conform” or follow exactly the deformation done on the Mesh layer (due to Puppet Tool, for example). This is very important, because logically, a 3D protrusion—for example on the Nose—must always follow the actual image of the Nose (when the Nose is moved around using the Puppet Tool), and not floating around to protrude the cheek and the mouth. To do this, you must of course Precomp all layers that’s making up the rigged body part (for example the face), and then duplicate this Precomp from the Project Panel. And then drag this duplicate down on the Timeline, side by side with the original Precomp. Inside this duplicate Precomp, you want to replace the layer that holds the Puppet Effect (normally the full colored layer), with a layer that contains the Displacement Map image (this layer has the same shape & outline as the colored layer, but only painted grayscale and contoured for use as displacement map). This way, you have two precomps side by side: one is the normal colored rig, and the other is the displacement map rig for use with FreeForm Pro. Of course you must tie/connect all the controllers (Nulls, Bones, etc) that deform the Displacement Map image, toward the con-



trollers that deform the actual colored-image, thus whenever you deform the colored-image using the Puppet Tool, BOTH THE colored & displacement map image will react the same way (and at the same time). Thus you have created a dynamically changing Displacement Map data that conforms to the actual animation. Note: the Displacement Map layer won’t actually have its visibility switch turned on, since it’s only going to be used internally by FreeForm Pro as the driver of Mesh distortion.



# CHAPTER 10:

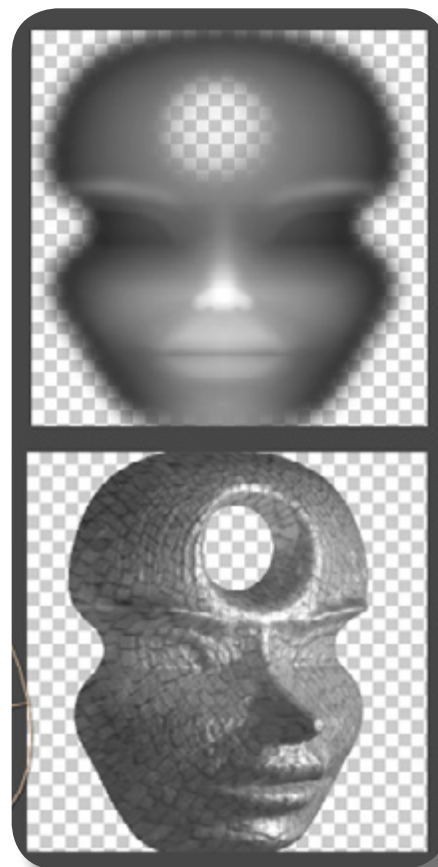
## The "Contour" Group



This group deals primarily with Alpha or transparency on the Mesh and Displacement Map layer. There is also a feature to blur either the Mesh layer or Displacement Map layer, without using dedicated blurring effects such as Gaussian or Fast blur.

### HOW FREEFORM PRO HANDLES ALPHA

As already described in a previous chapter, if you have Alpha area on your Displacement Map layer or the Mesh layer itself, the resulting 3D Mesh will be holed/cutout according to the Alpha. This hole is a perfect hole, not a semi-transparent hole, regardless of whether the Alpha is fully-transparent or just semi-transparent. The shape and size of this hole corresponds to the shape and INTENSITY of the Alpha, with fully-transparent Alpha yielding a bigger hole than semi-transparent Alpha.





## THE “ALPHA THRESHOLD” CONTROL AS A MATTE-CHOKER

Now that you’ve understood that any Alpha will eat/hole your Mesh, you must also know that FreeForm Pro has a built-in ability to enlarge or shrink that Alpha (the Alpha from Displacement Map layer or the Mesh layer itself), essentially making the hole on the Mesh bigger or smaller. You can do so using the “Alpha Threshold” control: this control acts in a similar behavior as the

“Matte Choker” or “Simple Choker” effects, that is, it enlarges or shrinks the Alpha area on a layer. In fact, you can make that Alpha area not to eat/hole your Mesh, so the Alpha will be interpreted as a flat area on the Mesh; simply set this “Alpha Threshold” control to a value of 0%. Any value higher than 0% (even if it’s just 1%) will make the Alpha to eat/hole your Mesh, as normally.

## CREATING SEMI-TRANSPARENT HOLE ON THE MESH

Now you may be wondering if it’s possible to create a semi-transparent hole on the Mesh, instead of always a perfect see-through hole regardless of the Alpha intensity. Well, you can achieve that using the two checkboxes under the “Alpha Channel” group (from this “Contour” group). The two checkboxes are “Use Texture Layer’s Alpha” (which means you’re using the Alpha from the Mesh layer), and, “Use Displacement Layer’s Alpha” (which means you’re using Alpha from the

Displacement Map layer). Anytime you turn ON any of these checkboxes, the Mesh will become transparent according to the Alpha information on the corresponding layer (no protrusion or anything weird, just transparency of the Mesh); thus if the layer has semi-transparent Alpha area, then the 3D Mesh will become semi-transparent too on that area, instead of a perfect see-through hole as it was previously.

Please note that defining Mesh transparency using this method is as good as setting the transparency using the material property’s “Opacity” control. Think of the material “Opacity” as making your Mesh transparent OVERALL, but if you want only SOME areas of the Mesh to become transparent, use the method described in this section. As usual, the transparent area can only see through toward 3D objects OTHER than

the Mesh, so you can’t see through toward other area of the Mesh itself (unless you’re using the “3D Transparency” control from the “Render Options” group, which will be explained later). Also, the transparent Mesh from this method will react normally to the Fresnel effect (if you have enabled the “Fresnel” feature), despite the material property’s “Opacity” being set to 100%.

## BLURRING USING THE “CONTOUR” GROUP

As already mentioned at the beginning of this chapter, FreeForm Pro has a built-in ability to blur either (or both) the Displacement Map layer or the Mesh layer,

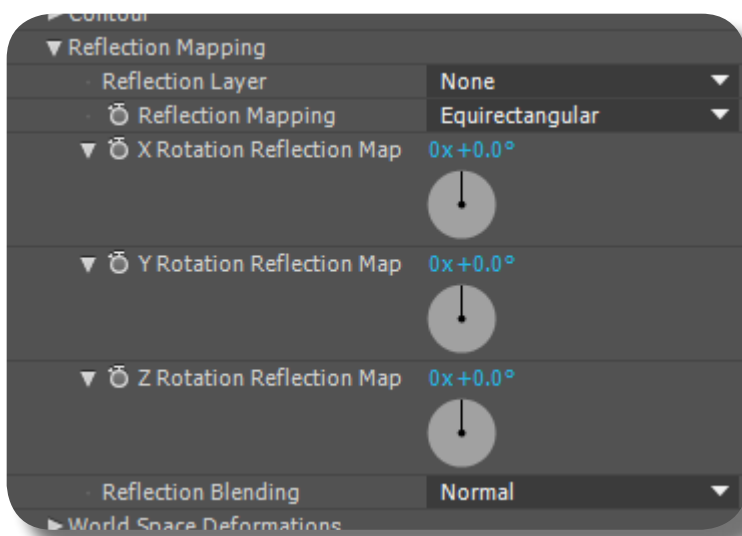
so you don't have to apply dedicated blurring effects to it. You can do the blurring using these controls:

- 01.** Pre-Blur Layer: this selects which layer you want to blur, as already mentioned. Blurring a Displacement Map layer will smooth the resulting 3D Mesh. Blurring the texture layer (i.e the Mesh layer), will obfuscate the appearance of the Mesh texture. You can blur both layers at once too.
- 02.** Pre-Blur Radius: this defines the intensity of the blurring. **NOTE:** even if you're using blur to smoothout your Displacement Map, if the color depth is still 8 bpc, there will still be apparent gradation lines on the Mesh.

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# CHAPTER 11:

## The “Reflection Mapping” Group



Giving your Mesh some reflectivity helps create the illusion of a metallic object, or any such reflective material. Under this “Reflection Mapping” group, you can set a layer that will act as the “Reflection Map” on your 3D Mesh; thus when you rotate & move the Camera or the Mesh itself, there will appear reflected image on your Mesh (the image being the “Reflection Map” layer itself), as if it’s reflecting the environment around it.

### BASICS ON HOW TO MAKE YOUR MESH REFLECTIVE

Creating reflection on your Mesh can not be achieved entirely using this group. With this group, you can define & manipulate the Reflection Map layer. First you must have a layer ready; preferably this layer has been created specifically as an HDRI image (wide-angle/spherical image), and has quite a good contrast between dark & light areas. Please note, as with Displacement Mapping, this Reflection Map layer needs to be Pre-composed if you want to apply changes to it, such as giving effects, paints, applying basic transformations, etc, otherwise those

manipulations will not be read by FreeForm Pro. And then you choose this layer from the “Reflection Layer” dropdown, to set it as the Reflection Map layer. Immediately you can see the layer being “reflected” on the 3D Mesh, and it’s even more apparent when you rotate & move either the Camera or the 3D Mesh itself. Now let’s go to the other group, namely the “Material Properties” group; here, you can set the strength of the reflection using the “Reflectivity” control: higher value means the Reflection Map is shown even more clearly.

## OTHER “REFLECTION MAPPING” CONTROLS

Under this “Reflection Mapping” group, in addition to the control just explained (“Reflection Layer”), here’s the explanation for the rest of the controls here:

**01.** The “Reflection Mapping” dropdown: this controls how the Reflection Map layer is “wrapped” as a 3D geometry. If your layer is created as a wide-angle HDRI image, you should choose either “Spherical” or “Equirectangular”

from this dropdown; “Cubic” is also possible, although it’s less popular. If your image is a simple flat image, usually you want to choose “Cubic”, although in practice you can just choose anything here.

**02.** X/Y/Z Rotation Reflection Map: once “wrapped” as a 3D geometry, the Reflection Map layer can be rotated around using these controls, thus rotating the reflection on the Mesh. This is useful

to find the best spot of the reflection image. But if you choose “Cubic” to wrap your layer, these rotation controls won’t have any effect.

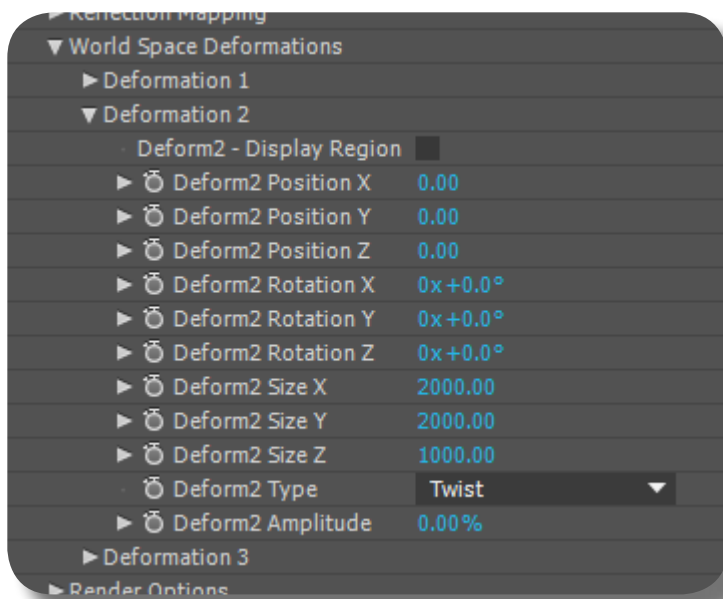
**03.** Reflection Blending: this sets the blending mode of the Reflection Map layer against the Mesh layer (Mesh texture).

Please note, as with Displacement Map layer, you can turn OFF the visibility/eye switch of the Reflection Map layer, because FreeForm Pro already “extracts” the image data from that layer.



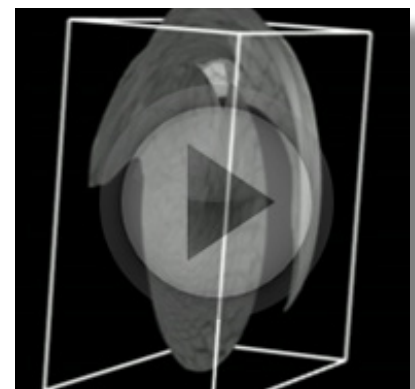
# CHAPTER 12:

## The “World Space Deformations” Group



This group is used for Twisting, Bending, and Bulging your entire Mesh (or other FreeForm Pro’s object--for example if you’re using Primitives or Generator--in its entirety). In other words, this group is about deforming your Mesh even more after it’s been deformed by Vertex/Tangents & Disp Map, for achieving some visual results, either for abstract motion graphic, or for creating a specific shape. Note when we’re using the word “Mesh” here, it can be understood as either the normal FreeForm’s Mesh, i.e a single 3D object that you deform using either Displacement Map or vertex/tangents manipulations, or, it could mean the whole (ENTIRE) 3D objects generated from Primitives or Generator.

When using this “World Space Deformations”, the original deformation of the Mesh, either from Displacement Map or Vertex/Tangents manipulation, will still be there of course, conforming to the Twisting, Bending, and Bulging from this group. Lights & shadows, as usual, will act normally on the resulting shapes.





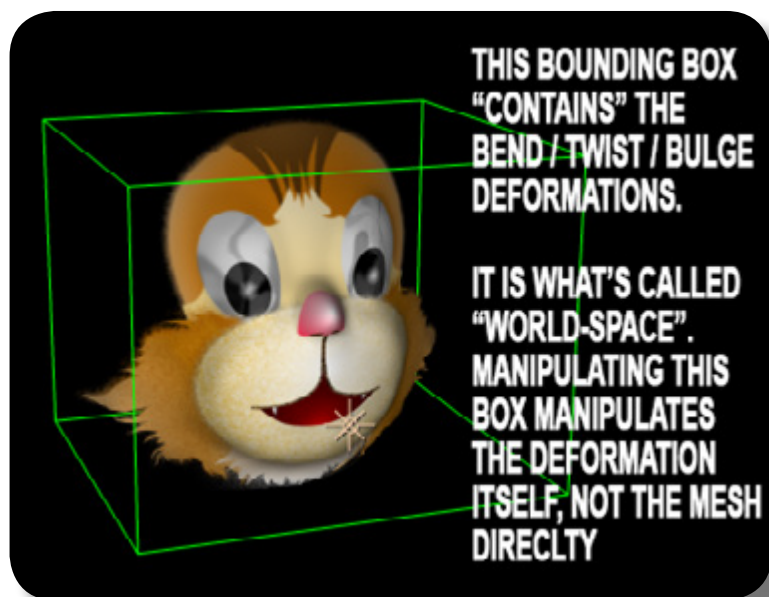
## HOW THE "WORLD SPACE DEFORMATIONS" GROUP WORKS

Using this group, essentially you can apply UP TO THREE consecutive deformations on your Mesh, i.e one deformation on top of the other deformation. You can see that there are three different sub-groups here "Deformation 1/Deformation 2/Deformation 3": one sub-group will apply its deformation on the mesh, and then the next group will apply its own deformation ON

TOP of the previous group's deformation, and so on and so forth. Each sub-group is applying to the Mesh ANY SINGLE ONE OF THESE deformations: Twist, Bend, or Bulge, which you can choose from the dropdown "Deform Type". You can then manipulate how each of those deformations are applied to the Mesh using the various transformation controls there.

## THE DEFORMATION WORLD-SPACE

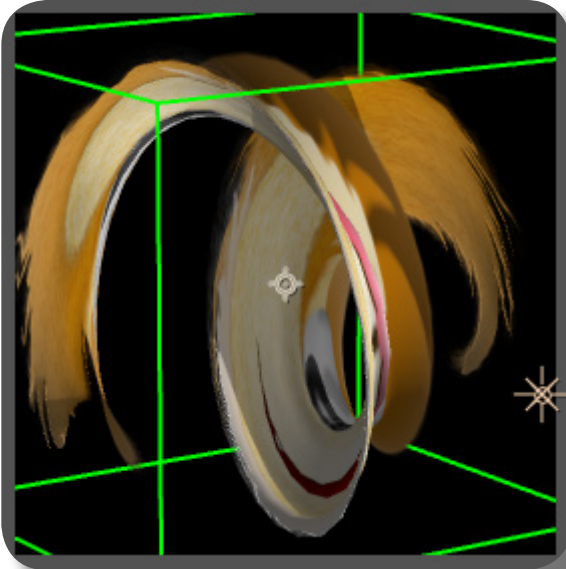
Under each sub-group, there's a checkbox "Display Region": this will display a colored bounding box/cube encompassing your Mesh, and this box represents the "deformation world-space". So any deformations from this group are contained within this bounding box ("deformation world-space"). This bounding box can be rotated, moved, or scaled using the "Deform Rotation X/Y/Z", "Deform Position X/Y/Z", and "Deform Size X/Y/Z" controls. If you do transformations on the bounding box using those controls, you will further deform your Mesh: there's no way to tell what each control is exactly doing, because it does different things in different situations, just make sure you watch the actual bounding box when you transform the "deformation world-space", and the deformation will make a little bit more sense. Just experiment with it. In summary, manipulating the "deformation world-space" bounding box is actually more about rotating/scaling/moving the "deformation" itself instead of the Mesh directly.



When you manipulate the bounding box so it doesn't encompass some part of the Mesh, sometimes the deformation will not happen on that area (Mesh not covered by the bounding box). Also please note that you can use the controls from "3D Transform" group to add even more deformation; and also note that the bounding box is not stuck to the Mesh when you do the "3D Transform" group on the Mesh. Additional note: as you already know, the bounding box is not tied to the Mesh, but what's even weirder is that when you move the original AE layer, i.e the 2D layer that

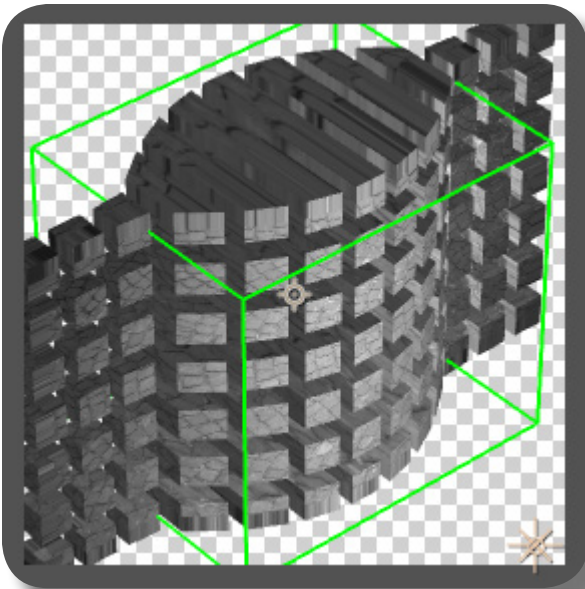
you apply FreeForm Pro to, the Mesh will move as it normally should, but the “deformation world-space” bounding box doesn’t even budge a little bit; thus this changes the deformation appearance too.

## TWIST



“Twist” mode will “wring” your Mesh, essentially creating a helix shape out of it. Of course, after you have set the “Deform Type” to Twist, nothing will happen, UNTIL you crank up the “Deform Amplitude” control. The greater the “Deform Amplitude” value (either positive/negative value), the helix shapes will become denser, i.e the twisting more severe. The direction of the twisting will be reversed if you use negative/positive value in this control.

## BULGE

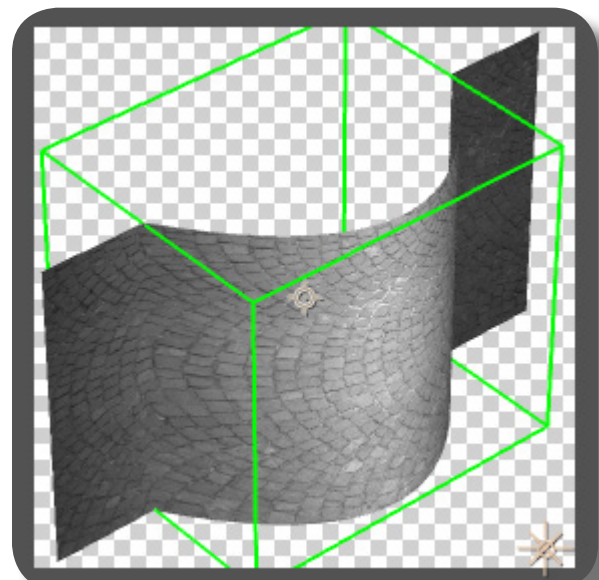


“Bulge” mode will only work properly if your Mesh has some depths to it, either due to Displacement Map or Vertex/Tangent manipulation, or due to Generator & Primitives (as seen in the picture here, Primitives create a “true” thickness instead of just contoured surface); it won’t work properly if it’s a perfectly flat Mesh. This mode will essentially bulge out your Mesh: the center horizontal area is bulging more than the left & right ends, thus the thickness/stretching is greater there. If the “Deform Amplitude” is a positive value, what happens is bulging as already described, but if it’s a negative value, the Mesh will become concave with the center area becoming thinner than the left & right ends. As usual, you can deform the Mesh more by manipulating the “deformation world-space” bounding box, or even the “3D Transform” group, as already discussed previously.



## BEND

"Bend" mode is about bending your Mesh in space, very similar to the bending/curving a layer using After Effects' "Raytraced 3D" feature. The center horizontal area has more flexing/bending outward than the left & right edge area, and unlike "Bulge" it's not playing with the thickness of your Mesh. The bending direction will be opposite, i.e inward/outward, if you use positive/negative value on the "Deform Amplitude" control. Also, the greater the "Deform Amplitude" value, either positive or negative, the more severe the bending. As usual, again, you can use the bounding box to deform your Mesh even more.

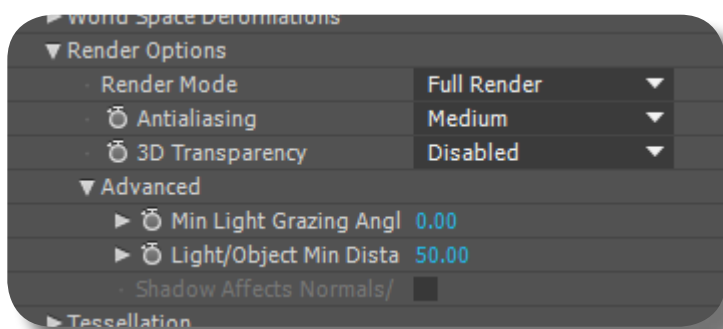


Please do remember that each of those controls already explained is keyframable/animatable, and you can add another deformation on top of the previous one as already explained, to achieve astonishing results.



# CHAPTER 13:

## The “Render Options” Group

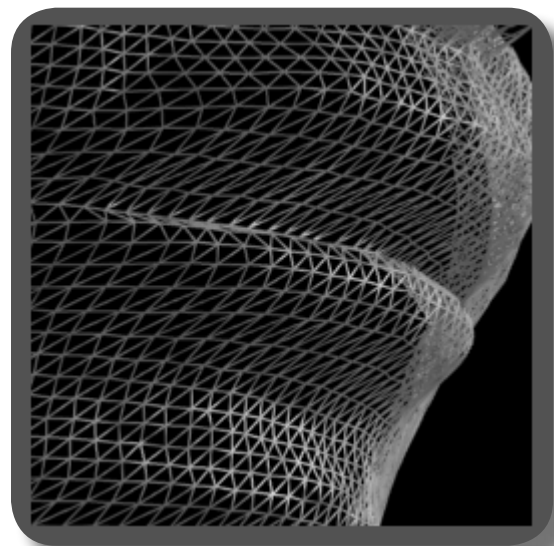


This group is quite a mixed bag, it contains three most prominent features: for showing your Mesh in different render modes (Wireframe, UV, Normals, etc), for smoothing the outline appearance of your Mesh (anti-aliasing), and for enabling the ability to see other parts of the Mesh itself if transparent. So let's explore each of the controls contained within this group.

### “RENDER MODE” CONTROL

This sets the viewing mode of your Mesh.

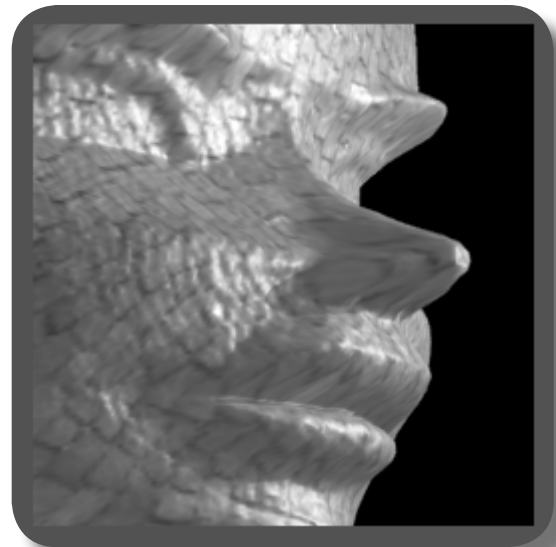
- 01.** Wireframe: displays the triangular wires, i.e the building block geometry of your Mesh. Each strands of wire still displays the original appearance of the Mesh layer including the reflection map if you have one, thus if viewed from afar, the Mesh may look like the original appearance albeit perforated.







- 02.** Full Render: this is the normal viewing mode, it displays the final appearance of your Mesh, with textures, material properties, lights, and shadows.



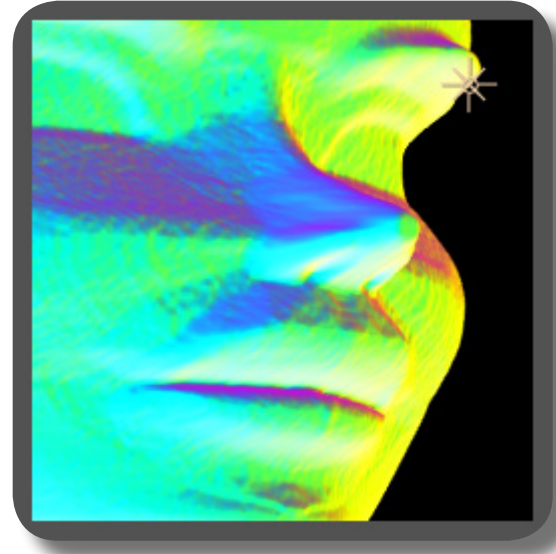
- 03.** Depth: this displays your Mesh in Gray-scale/BW appearance, corresponding to the depth/protrusion similar to what a Displacement Map image looks like, especially if you view the Mesh straight up-front. The depth is measured from the camera angle, i.e they're not static like a Displacement Map layer, but constantly changing depending on the camera view. Any mesh area closer to the camera will have a lighter/whiter color, while those further away will have darker/blacker color. Please note if the Mesh size is too small, there will be no apparent gray-scale image because the "depth" is too small.



- 04.** UV: This displays your Mesh in UV map projection mode, with yellow, green, and red colors on your Mesh surface. This purely displays projection, not optics, thus you won't see contour appearing.



**05.** Normals: this is displaying the Normals map. Almost similar to UV in appearance, but it's also showing the terrain contour of your Mesh, including the high-frequency noise (NOT through lights & shadows).



**06.** Shadows: this is showing a pure white appearance of your Mesh, no contour/terrain detail at all except when you see the silhouette/outline.



**07.** X-Ray: this will show only the silhouette/edge lines of the terrain contour, even those on the inside area of the Mesh & obstructed by protrusion from the camera view, because essentially, aside from out-lines, the Mesh surface area is transparent.





- 08.** Points: similar to Wireframe, but instead of strands of wire, it is displaying dots/points corresponding to the vertex points of the wireframe.



## "ANTIALIASING" CONTROL

This controls the Anti-aliasing on your Mesh, i.e whether edges/outline/silhouette area is shown smooth or stepped/jagged. When you're working in AE you might want to set this to Low or None for speedier working,

and once you are ready for final render, set this to Very High or Ultra High--choosing these two settings while you're working in AE taxes the performance quite noticeably.

## "MIN LIGHT GRAZING ANGLE" CONTROL

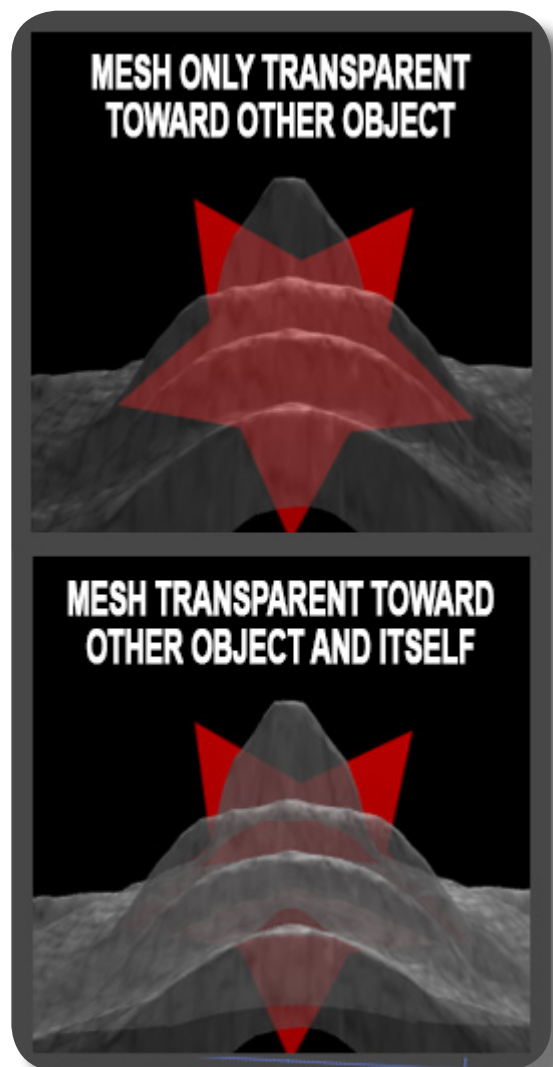
This expands or shrinks the shadow areas on the Mesh when there's a Light object.

## "SHADOW AFFECTS NORMALS/UV" CONTROL

This checkbox is only available if you've set the "Render Mode" dropdown to either Normals or UV. This checkbox defines

whether shadows (from the Light object) is casted or not on the Mesh, when you're in the Normals or UV viewing mode.

## “3D TRANSPARENCY” CONTROL



Whenever you have made your Mesh transparent by setting the material property’s “Opacity”, you’ll notice that **NORMALLY** it is transparent only toward other objects/layers, or toward sky-dome; it is not transparent toward the Mesh itself, for example if you have a protrusion, you can’t see beyond that protrusion toward other part of the mesh itself. Now, with this “3D Transparency” control, you can achieve exactly that. The options “2”, “4”, or “All layers” will define the depth that you can see through, i.e if there are multiple protrusions/folds stacked in your Line of Sight’s depth; smaller value means shallower depth/see through ability, vice versa. Please note that if you set the Mesh’s opacity through other means, such as the “Mist Opacity” in the Environment group, then it must work in tandem with the material property’s Opacity to be able to see through like this. **NOTE:** of course it’s still transparent toward other objects as well after you’ve set this “3D Transparency” control.

## CREATING A GRAYSCALE IMAGE USING THE RENDER MODE “DEPTH”

Using the Render Mode “Depth”, you can actually use FreeForm pro to generate a grayscale image for use in other Effects. For example, once you have created a rippling water surface animation in FreeForm Pro, you can then use the Depth Mode for

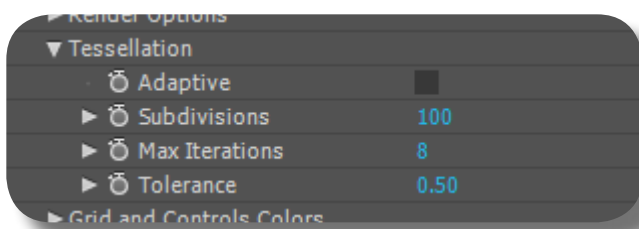
the Mesh, and then preferably move your camera in a straight front-view, and then Precomp this layer. Now you have a grayscale image layer that can be used for other Effects such as the Displacement Map effect.

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# CHAPTER 14:

## The “Tesselation” Group

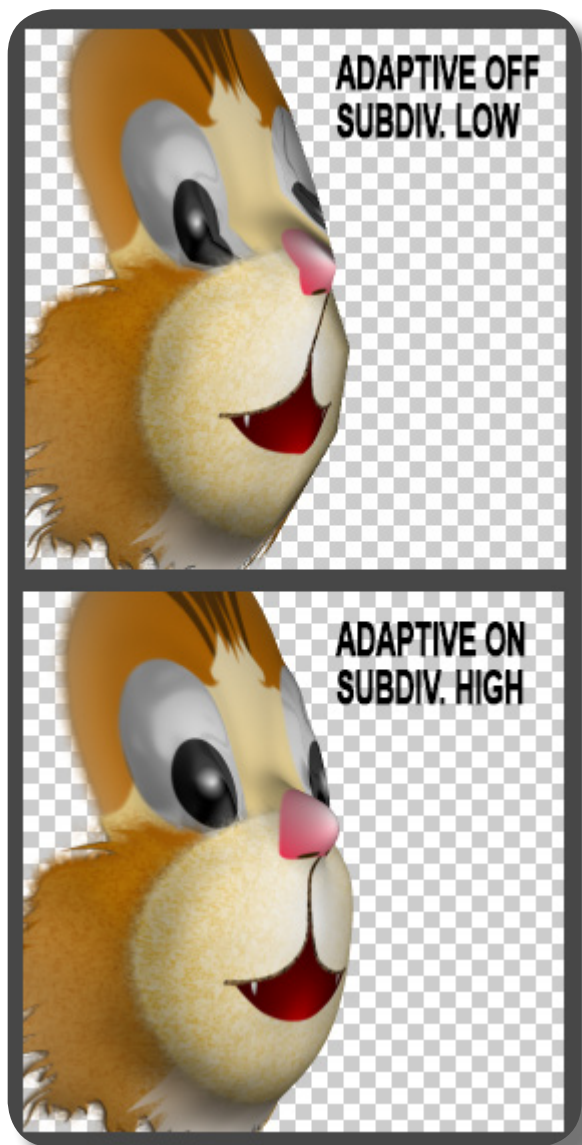


This group deals with creating a cleaner & smoother appearance of your 3D Mesh; or the exact opposite, to create blocky & jagged appearance. If you’re familiar with 3D modelling, you know that a 3D Mesh consists of smaller building blocks; the more numerous these building blocks are, the smoother the Mesh. If you’re skimping on these building blocks, the viewport may react faster, but your 3D Mesh will look blocky and jagged. The same thing applies to FreeForm Pro.

### SMOOTHING OUT THE APPEARANCE OF THE MESH

Under this “Tesselation” group, there are two controls: “Adaptive” and “Subdivisions.” The “Subdivisions” control will set how smooth the mesh is, just like in the Puppet Tool where if you have more triangles the Mesh becomes smoother, etc. If you set “Subdivisions” to lower value, the most

apparent area is the outline of the Mesh (silhouette) where it doesn’t look clean-smooth but blocky instead. Higher number means smoother mesh, and vice versa. But the real key to smoothing your Mesh is the “Adaptive” checkbox. So, even if you have a lower value on the “Subdivisions” control, if



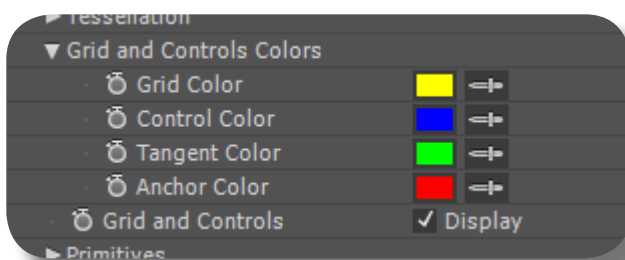
you turn “Adaptive” ON, the mesh will already become smooth. Turning OFF “Adaptive” and set “Subdivisions” to lower value will speed up the processing with FreeForm Pro; so you may want to turn it ON & set higher value once you want to render the final output. You can also keyframe the “Subdivisions” control, e.g for a faraway shot of the Mesh you set it low so you don’t waste your processing power, and then for close-up shot you set it high.

These two controls can also smooth out jagged Mesh if you haven’t bothered to blur your Displacement Map layer. But of course, where there is stark contrast between dark & light areas, there will always be clear & definite edge on the Mesh, regardless of how much you blur the layer or crank these two controls.

The “Tolerance” control is also useful to smooth your Mesh when you’re using Displacement Map, although the benefit is not really apparent in a Mesh created with FreeForm Pro. If it’s a Mesh created with ShapeShifter, then this “Tolerance” control becomes really useful to smooth the 3D object.

# CHAPTER 15:

## The "Grid and Controls Colors" Group

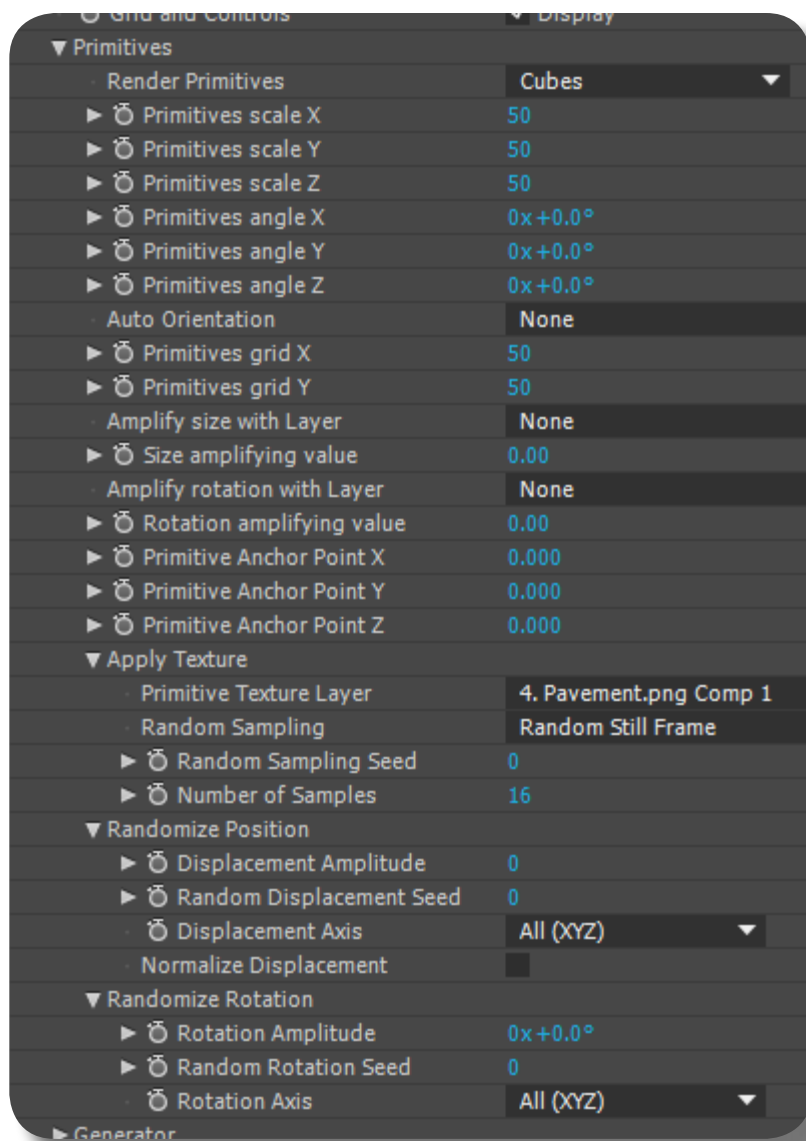


Please be patient! This group has the longest name and rightly so, because it's the simplest group in FreeForm Pro. Using this group, you can change the colors of the Grid elements, such as Grid (yellow lines), Control (vertices), Tangents, and Anchor (anchor point). And just below this group, there's the "Grid and Controls" checkbox, that you can use to show or hide the Grid and its elements.

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# CHAPTER 16:

## The “Primitives” Group



The “Primitives” group is arguably the second largest group in FreeForm Pro, second only to the Generator group, although its use is not as widespread and far reaching as the Displacement Mapping group (the third largest). With this “Primitives” group, you can create an array of primitive 3D objects from your layer. This is good for creating abstract motion graphics artworks. There’s also the possibility of creating a single big primitive object that you can use for whatever purposes.





## GENERAL MECHANISM OF THE "PRIMITIVES" GROUP

Generally, this group is used for "dividing" your layer (either image or video) into an array (swarm) of primitive objects. These primitive objects have the texture/display of your layer. They can then be manipulated in a "swarm-like" manner, similar as in the "Generator" group, that is, manipulating small objects as an array/collection/swarm.



For example, you have an image layer, and using this "Primitives" group you divide that layer into an array of cubes. Each cubes will have a section/a part of that layer as its texture, and each SIDES of the cube will have the same texture image. Dividing your layer means that there are some areas of the lay-

er that will not be shown, i.e parts of the layer that reside IN-BETWEEN the primitive objects (i.e gaps) will not be shown, UNLESS you have set a quite dense population for the primitives thus each having smaller & smaller gap between them.

Applying Vertex/Tangent deformations, or even Displacement Map, will of course alter the POSITIONING of the primitives, conforming to the contour of the deformations.

As usual, Light and Shadows will react normally to these primitive objects, as in the Generator group.

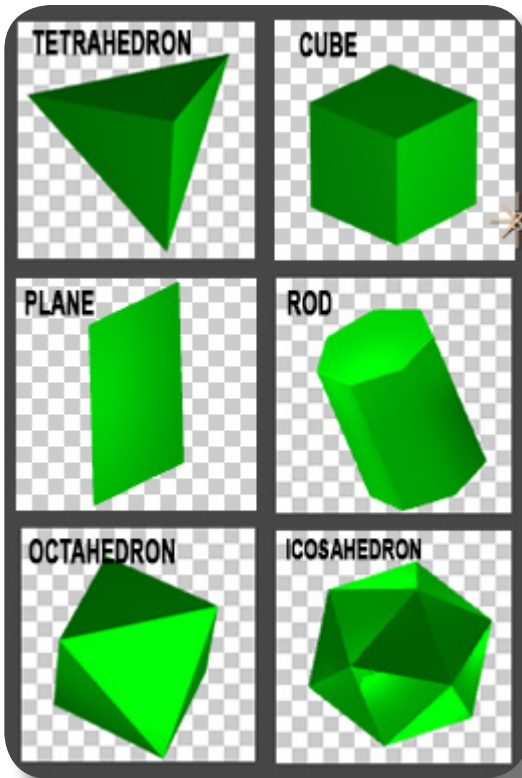
Another use for this group is to create a single big primitive object (or just a few of them), which you can then apply a custom texture that you want; this single big prim-

itive object can be used for whatever purposes, although this is not the normal use for this group.

The layer that you want to transform into primitives IDEALLY must not have any Alpha/transparency, because some of the primitives will have Alpha as their texture, thus appearing holed out & not solid. This is especially dangerous if you want to create a

single big primitive, because sometimes you can't even see that single primitive due to it being created on the Alpha area of the layer (thus its texture is entirely alpha, i.e invisible at all). OK, now let's explore all the controls & specific mechanisms in this group!

## “RENDER PRIMITIVES” CONTROL



From this control, “NONE” will of course disable the creation of primitives, thus you’ll have the normal appearance of your mesh layer. “Cubes” will create cube primitives from the layer (you know what a cube is); every side of the cube has similar texture image. “Tetrahedrons” will create pyramid primitives, i.e three-sided pyramid; the texture image is wrapped around the pyramid, thus each sides not having similar texture image. “Octahedrons” will create a primitive that looks as if consisted of two four-sided pyramids glued together on the pyramid’s base; the texture image is wrapped around one pyramid, and the other pyramid has the same texture image (thus two copies of the texture). “Icosahedrons” will create a primitive that, in simple terms, looks like a solid object having 20 faces, each face is an equilateral triangle (triangle whose sides have the same length); all faces have the same texture image. “Rods” will create a primitive that looks like a cylinder, but instead of a smooth circular tube, it is a seven-sided tube; the texture image is applied on three areas (thus three copies): the top cover, the bottom cover, and the length of the tube itself i.e wrapped around the seven sides. “Planes” will of course create plane primitives, i.e flat 2D surface; regardless of how you scale it it’ll always be flat; the texturing is obvious, i.e the front & back sides having the same texture image, similar to the appearance of a normal AE 3D layer.

## “PRIMITIVES SCALE X/Y/Z” CONTROLS

These controls will scale each primitives on its own X/Y/Z axis. Please note that scaling will enlarge/shrink the area of the texture image covered (texture image is not stretched, instead the image area that the

primitive covers will be enlarged). Also note that there’s no adjustment on the distance between primitives, so they may overlap each other if the scaling is too big.

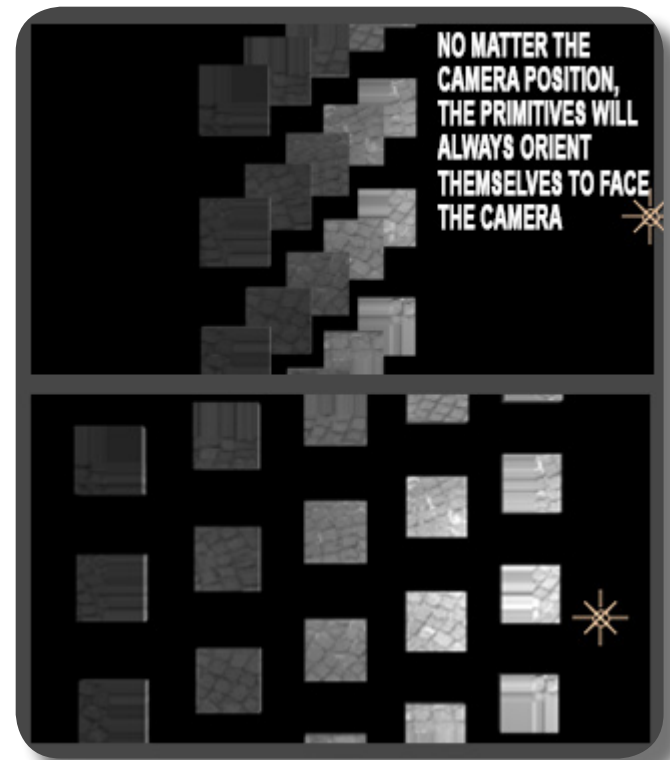


## "PRIMITIVES ANGLE X/Y/Z" CONTROLS

These controls will rotate each primitives on its own XYZ axis.

### "AUTO ORIENTATION" CONTROL

If you choose "Orient Along Path", all the primitives will be automatically oriented (thus rotated) toward a Path. If you choose "Orient to Camera", each primitives will have its rotation/orientation changed automatically to always face the camera; any rotations done on the primitives will then serve as an "offset angle/rotation" against this auto orientation toward camera. Which side/face actually faces toward the camera is not really important once you have applied this "offset angle", but if you really want to know, if you haven't applied the "offset angle", the side that always faces the camera is the back-side of the primitives, i.e the side opposite the normal facing of the Mesh layer. If you choose "NONE", of course the primitives' orientation will be manipulated through the "Primitives Angle X/Y/Z" controls, as already described, or through the random rotation functions, which will be explained later.



### "PRIMITIVES GRID X/Y" CONTROLS

These will define the number/population of the primitives, i.e the length X width population (horizontal X vertical). Higher value means denser primitive populations, thus less gap between them (even overlapping), and in turn more of the image layer is shown (not hidden by the gap). These controls are also important if you want to create a single big primitive, as already mentioned before: just set both the "Primitives Grid X" and "Y" to a value of 1, and then scale it up so

big using the "Primitives Scale X/Y/Z" controls. Normally, this single primitive will be created on the 10-o'clock area of the layer. The texture of this single primitive will be as usual, i.e using the image layer that you apply FreeForm Pro to, but later on we will explain that you can change all primitives' textures using another layer. Note: this single primitive is not affected by the "Subdivisions" setting.

## “AMPLIFY SIZE WITH LAYER” CONTROLS

Using this control (and the control below it, “Size Amplifying Value”), you can set the scaling/size of different groups of primitives based on the luminance value (BW/grayscale) of another layer. This “Amplify Size With Layer” control lets you set what layer that contains such luminance value.



This is how this feature works: after you have set such a layer, you then crank up or down (either in positive or negative) the “Size Amplifying Value” control to scale/size the primitives, and these primitives are divided into three groups: one group of primitives reside on the area where the layer’s luminance value is above 50% (i.e more than 50% white), one group resides on the area where the luminance is exactly at 50%, and one group on the area where the luminance is below 50%. When you crank up the “Size Amplifying Value”, those primitives on the

luminance area below 50% white will be scaled down while those above 50% will be scaled up; the opposite also happens: when you crank down that control, those above 50% will be scaled down, and those below 50% will be scaled up. Those primitives on the exact 50% luminance will not be affected whatsoever. Also, the further away it is from 50% luminance, the change (i.e scaling up/down) will be more severe, while those primitives that reside on area whose luminance is nearer 50% are more inert.

Please note that adjusting the “Size Amplifying Value” too high (on the positive) or too low (i.e on the negative) will result in some primitives being scaled too small thus vanishing and then reappear for being scaled up, while those primitives who get bigger

will of course get even bigger. The scaling happens in all XYZ axes, although it’s not at all changing the settings on the “Primitives Scale X/Y/Z” controls, in fact you can use those controls to work in tandem with this “Size Amplifying Value”.

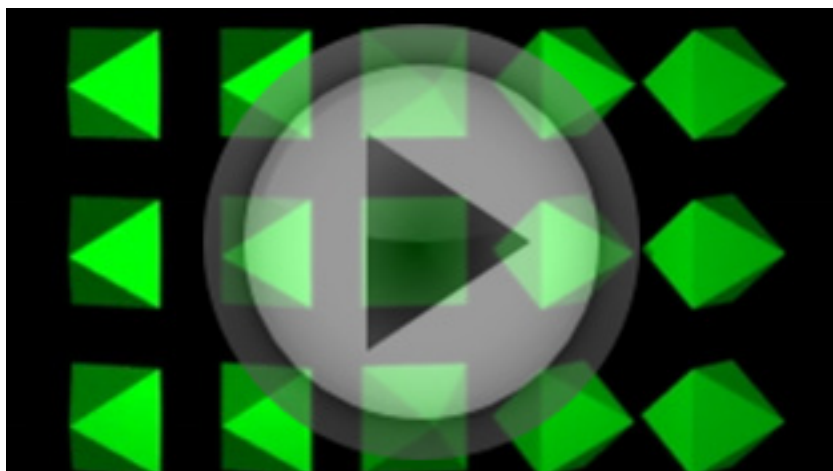




Just as usual, the layer that contains luminance value must be precomposed if you wish to apply changes to it, otherwise those changes will not be recognized. Regarding Alpha on that layer, it will be treated as zero luminance value, i.e far below the 50%. And if you wish to create the luminance layer

yourself, you can use AE's Paint tool to paint the luminance data; you can paint a pure white brush against a black background, and the opacity of the brush defines the strength of the luminance (e.g, 50% brush opacity means 50% luminance value).

## "AMPLIFY ROTATION WITH LAYER" CONTROLS



This works using the similar mechanism as the previous controls, regarding the intensity of change based on luminance value of another layer; but instead of scaling, it does rotation on your primitives. These controls work in tandem with the "Primitives Angle X/Y/Z" controls: if all the angles are at zero value, this "Amplify Rotation" will not have any effects whatsoever.

This is how it works, for example: assuming that you already set the luminance layer; after you have set a rotation value of 35 degrees on the "Primitives Angle X" control, you can then crank up the "Rotation Amplifying Value" control, thus each primitives will be rotated on ITS OWN X axis depending on the luminance value that it resides on, as you already know: those above 50% will do the opposite rotation of those below 50%, and those on the exact 50% luminance will be completely inert; the further away the luminance strength from 50% value, the rotation will also be greater than if the luminance is near the 50% strength. Now, if you set the other axis from "Primi-

tives Angle X/Y/Z" at zero value, of course the primitives will not rotate on those axis. And if you set a greater angle on the "Primitives Angle X/Y/Z" controls, the sensitivity of the slider on the "Rotation Amplifying Value" will also be greater (thus greater rotation happening). If you have set a value greater than zero on multiple axis of the "Primitives Angle X/Y/Z" controls, when you crank the "Rotation Amplifying Value" control, each mesh will also rotate on those multiple axis the usual way. The magnitude AND DIRECTION also depend on the angle value for that axis, i.e not only the value but also the positive/negative sign.





Now, instead of using the “Rotation Amplifying Value” as the main rotational control, you can use the “Primitives Angle X/Y/Z” controls to make the rotational changes, albeit having different rules/effects than what’s already described, so this is how it works: after you have set the usual luminance layer & cranking the slider, you can do the main rotation manipulation using the “Primitives Angle X/Y/Z”: The luminance value no longer dictates the DIRECTION of the rotation, but instead all primitives will rotate in the same direction. The luminance value now dictates the difference in rotation MAGNITUDE, with brighter areas normally having greater rotation than the darker areas. The “Rotation Amplifying Value” defines the be-

havior of dark & light areas: if this control is set to positive value, then the brighter areas will have greater rotation than the darker areas, the greater the positive value, the rotation will also be greater on the brighter area and a lot slower on the darker area (even to the point of stop rotating at all on the darker area). If “Rotation Amplifying Value” is set to negative value, the reverse will happen: the darker area will have greater rotation than the brighter area, and the greater the negative value, the rotation on the darker area will be much greater while the brighter area much slower; and if this control is set to zero, all primitives will rotate with the same magnitude, no difference at all (see the video above for clarity).

An important note (this also applies to the previous “Amplify Size With Layer” controls): If you don’t set the luminance layer

(set to NONE), when you crank up the controls, the primitives are also scaled/rotated, albeit uniformly.

## “PRIMITIVE ANCHOR POINT X/Y/Z” CONTROLS

These controls will reposition the anchor point (albeit invisible) of EACH primitives, thus the scaling and rotation of EACH primitives will hinge/pivot from that new anchor point location. Just look at the direction of primitives’ movement when you’re manip-

ulating these controls: if the primitives are moving to the right, the anchor point is relocated more to the left area of EACH primitive; if the primitives move upward, the anchor point is relocated more to the bottom, etc.



## "APPLY TEXTURE" SUB-GROUP

This will let you choose an image or footage layer as the texture for your primitives, replacing original texture from the Mesh layer. This is how it works: to select a layer as the new texture, simply choose from the dropdown "Primitive Texture Layer", immediately you can see that EVERY primitive will have the ENTIRE/WHOLE layer as its new texture; this is in contrast to the previous texture where each primitives will only have a chunk/a part/a segment of the texture layer. And the way this new texture is wrapped around the primitive is still the same as already described sometime ago.



The next three controls, regarding "randomization", concern a texture that is a footage/movie. More specifically, these randomization controls only affect the footage texture that you set in the "Primitive Texture Layer" dropdown, and not the original footage Mesh layer if you have one. This is how the randomization works: assuming you already set a footage/movie

file as the texture layer, if you set the "Random Sampling" dropdown to "None", the footage texture will be played back normally when the CTI moves. If you set it to "Random Still Image", there will be no playback of the texture; instead, the footage is frozen as still frames, and each primitives will have the frozen footage at a random frame.

The "Number of Samples" defines how many different still frames there are for the entire primitives, for example, if you set this value to 2, there will be only two different still frames (frames captured at TWO different

times), and these two will be applied randomly to the entire primitives, i.e regardless of the randomization, there will ALWAYS be two kinds of frame for the entire Primitives, not more and not less.

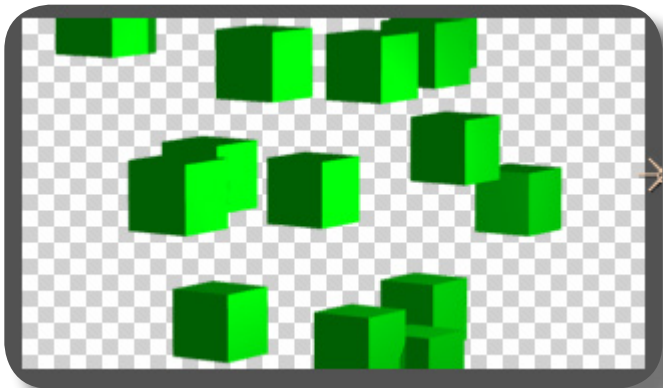
The “Random Sampling Seed”, lets you input any numbers here to generate a new randomization; what’s being randomized

Now, if you set the “Random Sampling” dropdown to “Random Loop” instead of the “Random Still Frame”, the mechanism is all the same, except for two things: instead of being still image, we now have the footage texture played back in a loop, and, instead of random still frames (random times

are two things: the time at which the still frames are captured, and, the distribution of these frames against the primitives.

in which they’re captured), we have random START TIME for the looping footage. Of course each primitives will have the footage played back normally, in its entirety, and looping, no random jumping forth; only the start time is different between primitives (see the video above for more clarity).

## “RANDOMIZE POSITION” SUB-GROUP

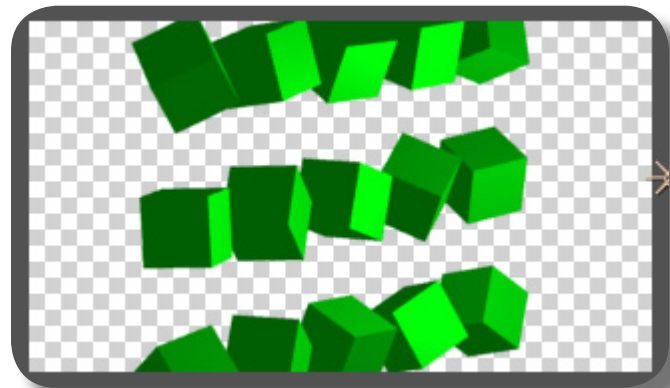


These controls will randomize the positioning of each primitives, i.e only the position, not the orientation, and they may greatly overlap each other (as if the primitives are joined). “Displacement Axis” defines whether the positioning happens only on the X, Y, or Z axis, or all of them at the same time. AND PLEASE NOTE that these axes are the global axis, so they’re not influenced by the primitives orientation. “Displacement Amplitude” defines the magnitude/distance of the positioning. “Random Displacement” creates the randomization, essentially a “Seed” control similar to “Random Sampling Seed” described previously. “Normalize Displacement”: turning ON this checkbox causes the randomization to be rather uniform, where some primitives have their positions aligned with others; unchecking this option makes the randomization truly random.



## "RANDOMIZE ROTATION" SUB-GROUP

These controls will randomize the rotation/orientation of EACH primitives on its OWN axis. Once you have randomized the orientation, you can either use the "Primitives Angle X/Y/Z" controls for the main rotation, or the "Rotation Amplitude" from this sub group. If you use the former, the axis used for the rotation will be the global axis regardless of primitives' orientation, i.e horizontal is still X, vertical is still Y, etc; and the rotation will be uniform for all primitives (direction & speed wise). If you use the latter, the rotation direction & speed will be random/different BETWEEN each primitives. Explanation of the controls there: "Rotation Amplitude" defines the magnitude/greatness of the rotation angle once you randomize it. "Random Rotation Seed", as usual, the "seed" control as you already know. "Rotation Axis" defines in which axis the random rotation will happen. NOTE: if you use the "Rotation Amplitude" as the main rotational control, you don't even need to input the "seed" value first.

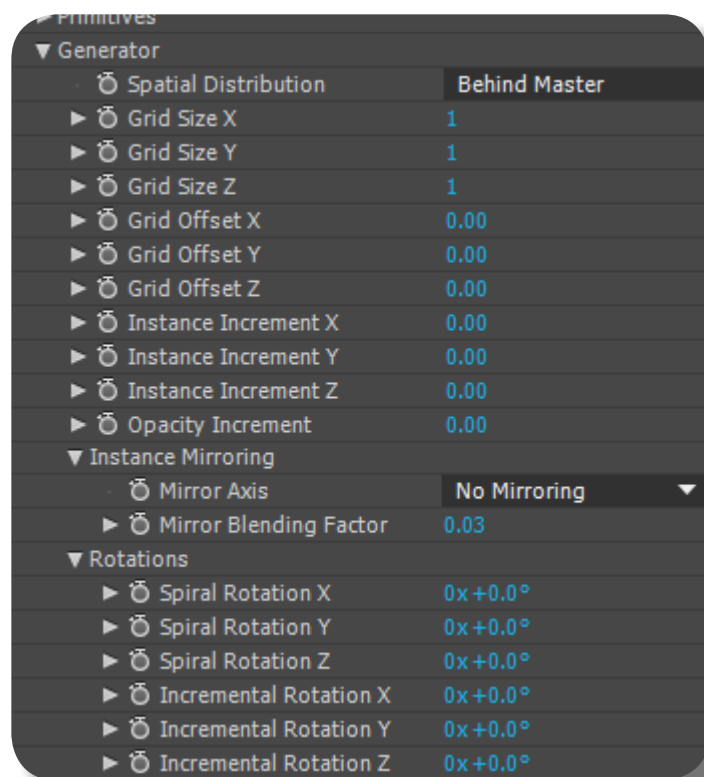


# CHAPTER 17:

## The “Generator” Group

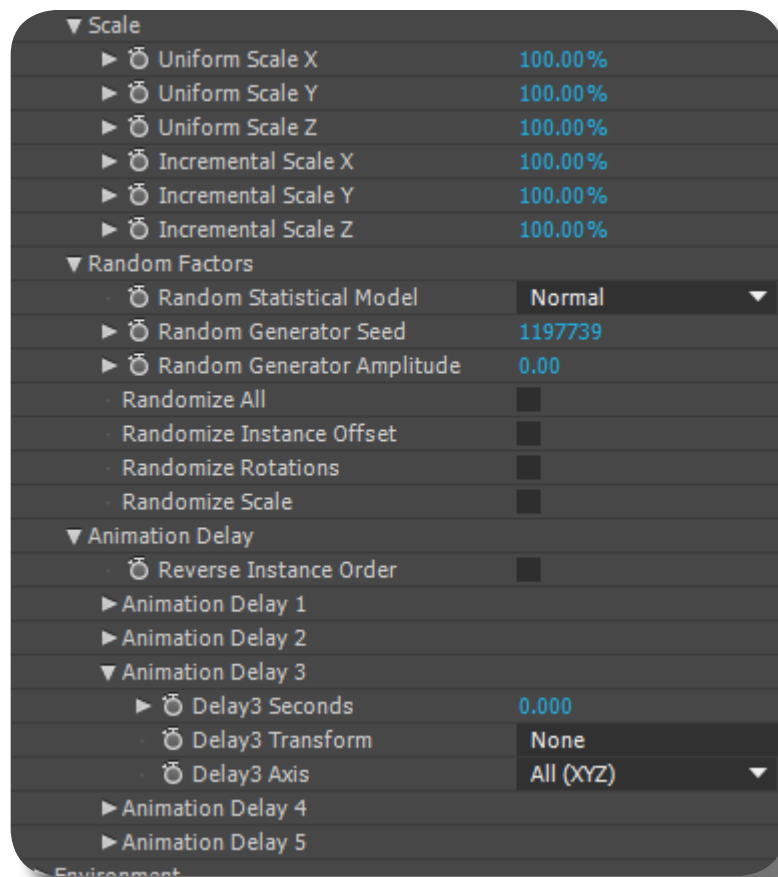


The largest group of FreeForm Pro and the most complex, as you can see we can’t fit the whole screenshot into a single page here! Some artists even think “Generator” can become a separate plug-in of its own. If you’re familiar with AE Shape Layers, then you know the “Repeater” feature; the “Generator” is similar in function to that, albeit in 3D; that is, to create duplicates of the Mesh and manipulate these duplicates.



As with the “Primitives” group, the “Generator” is perfect for creating abstract motion graphics, or if you’re skillful enough you can create complex 3D objects with it. As usual lights & shadows can interact normally on the duplicates too; for example, if light is obstructed by a duplicate Mesh, shadow will be cast on the Mesh behind it. OK, let’s explore all its controls in depth!





## "GRID SIZE X/Y/Z" CONTROLS

These controls set how many duplicates of the Mesh on the horizontal, vertical, and depth axis, respectively. Please note that a minimum value of one is required on all these "Grid Size X/Y/Z" controls; if just one of the controls is zero, there will be no Mesh at all. Also, please note that each controls will compound upon an already existing

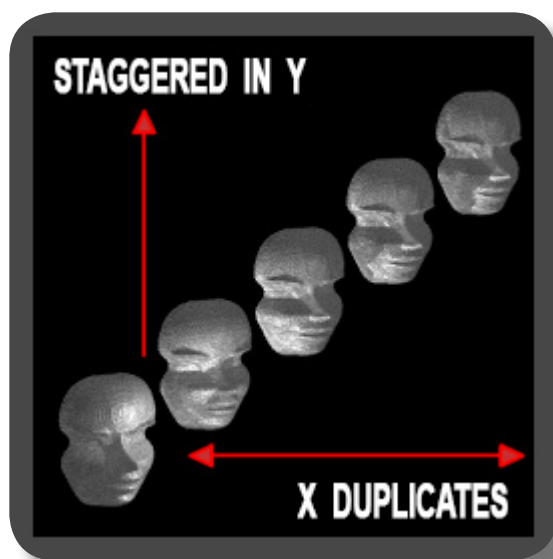
mesh duplicates; for example you have three duplicate Meshes on the X axis, now if you set "Grid Size Y" to a value of two, ALL the horizontal Meshes (X axis) will be duplicated on the vertical axis (Y) too, so now we have six meshes in total, i.e three horizontal multiplied by two vertical. Think of it like a cubic array, i.e Width x Length x Height.

## “GRID OFFSET X/Y/Z” CONTROLS

These controls the distance between duplicate Meshes. You might notice when you input a value on the “Grid Size X/Y/Z” controls, no duplicates seem to appear; that’s because all duplicates are still stacked/overlapping perfectly on the same spot, that’s

why you have to crank up these “Grid Offset X/Y/Z” controls. “Grid Offset X” will control the horizontal distances between ALL duplicates, “Grid Offset Y” will control vertical distances between ALL duplicates, etc.

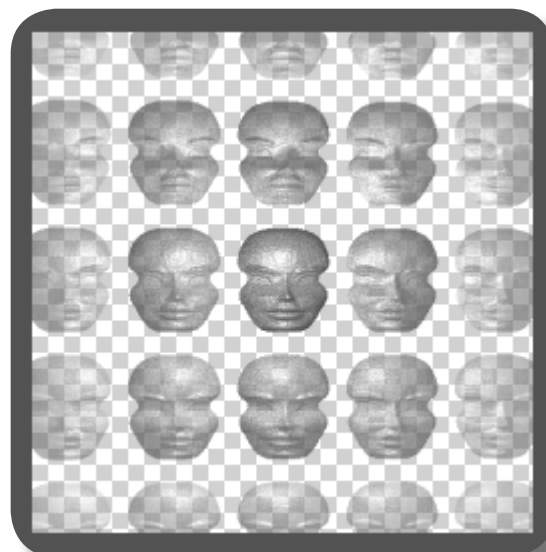
## “INSTANCE INCREMENT X/Y/Z” CONTROLS



These controls will have no effects whatsoever if the “Grid Size X” has a value of one, so in essence you must duplicate your meshes on the horizontal axis for these controls to work. These controls will STAGGER the X, Y, and/or Z positioning of the HORIZONTAL DUPLICATES. Staggering means, the further away a duplicate is from the original mesh (the further away horizontally) the greater the displacement in X/Y/Z axis. Just experiment right away so you may understand what we mean.

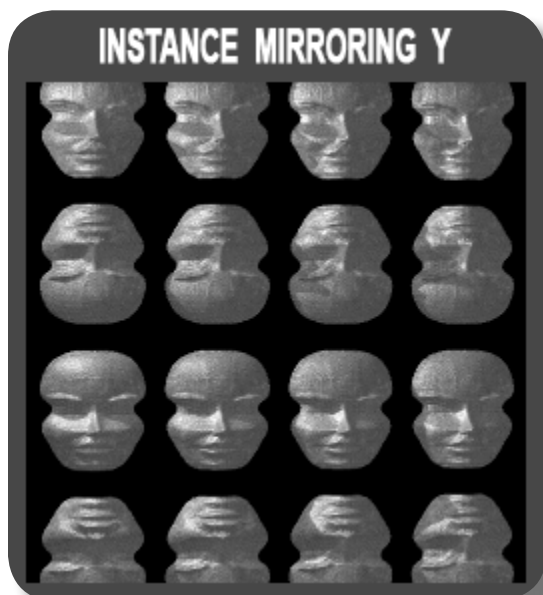
## “OPACITY INCREMENT” CONTROL

Increasing this control on a positive value will do nothing, unless you have reduced your Mesh opacity beforehand (using Material Property’s “Opacity”). So usually you just play on the negative value to reduce the Opacity of the duplicates, making them more transparent. This control reduces the opacity of the duplicates the further they are from the original Mesh; distance is not calculated using the normal distance such as set by the “Grid Offset” controls, rather it’s about “how many duplicates” between this mesh and the original mesh. The original Mesh will always have full opacity regardless of this control.



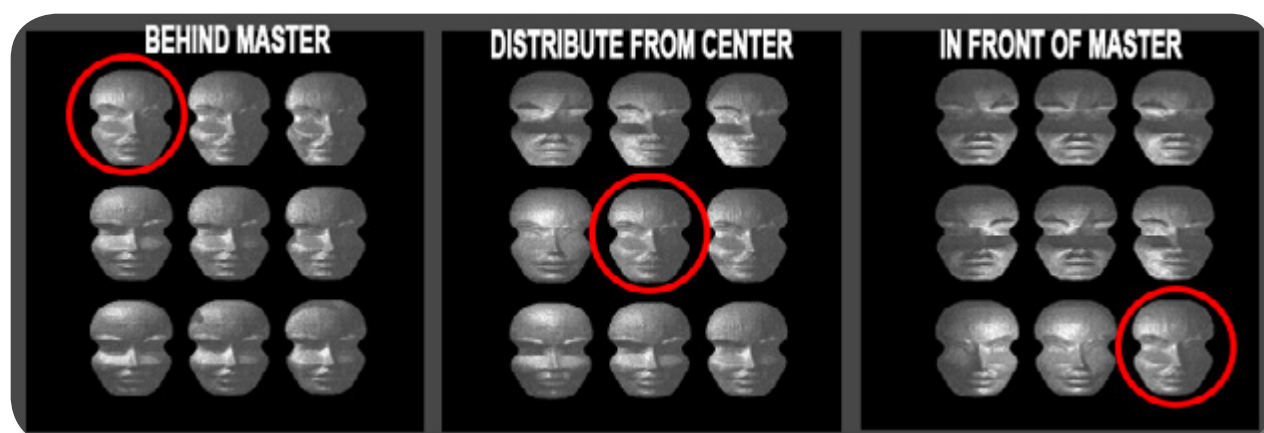


## "MIRROR AXIS" CONTROL



This will flip the duplicates. If you choose "Mirror On X", for every second column the meshes there will be flipped left-right (flipped horizontally). If you choose "Mirror On Y", for every second row the meshes there will be flipped top-bottom; remember, flipped, NOT rotated. If you choose "Mirror On XY", it's combining the two previous options: your array of meshes will be flipped every two rows and columns, thus you will see some meshes being flipped both vertically & horizontally, for example if they happen to be located on the second row and second column.

## "SPATIAL DISTRIBUTION" CONTROL



This defines the positioning of the duplicates in relation to the original Mesh. "In Front of Master": this makes the new duplicates to be created on the leftside of the original Mesh and upward, i.e if you have horizontal duplicates, they'll be created on the left side of the original Mesh, and if you have vertical duplicates, they'll be created upward/above

from the original mesh. This setting has nothing to do with the name, except when the duplicates share the same Z axis and are crowded/overlapping together, then meshes closer to the original Mesh, i.e closer horizontally, is visually placed BEHIND the Meshes further away thus some part of it may be hidden; the original Mesh always appears in

front of everything. "Behind Master": this is the opposite of the previous setting. New duplicates will be created on the rightside and downward of the original Mesh, etc, ditto when the Meshes overlap it's the opposite of the previous setting. "Distribute Equally from Center": new duplicates will

be created equally in all directions of the original Mesh, but the left & upper areas are favored first before the right & lower areas. NOTE: all these controls don't affect the duplicates on the depth axis (Z), i.e they will always be created BEHIND the original mesh.

## "SPIRAL ROTATION X/Y/Z" CONTROLS

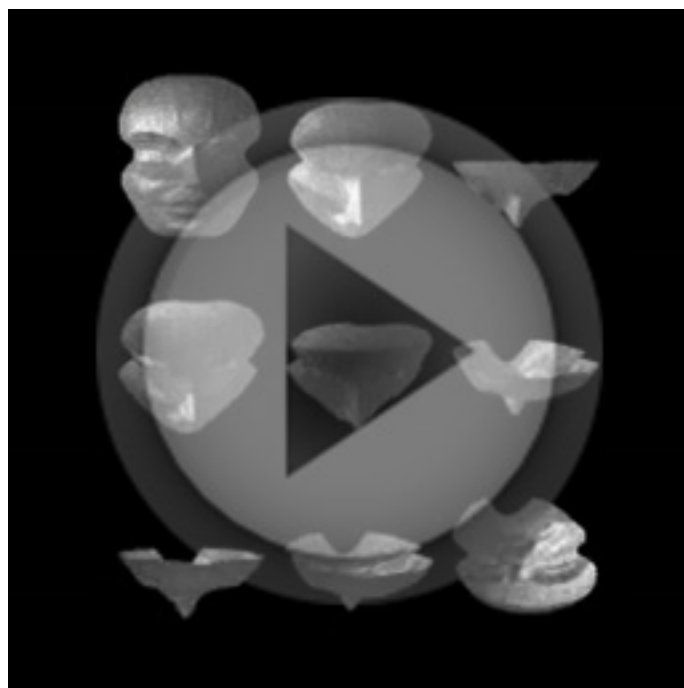


This will "revolutionize/orbit" the duplicates around the original Mesh; for example, if you play with the "Spiral Rotation X", the duplicates will make revolutions/do orbiting on the X axis, i.e they will orbit vertically around the original Mesh. The further from the original Mesh, the faster the revolution rate. And please note that the duplicates are not just doing revolution, but also changing their own orientation/facing according to the revolution's direction.



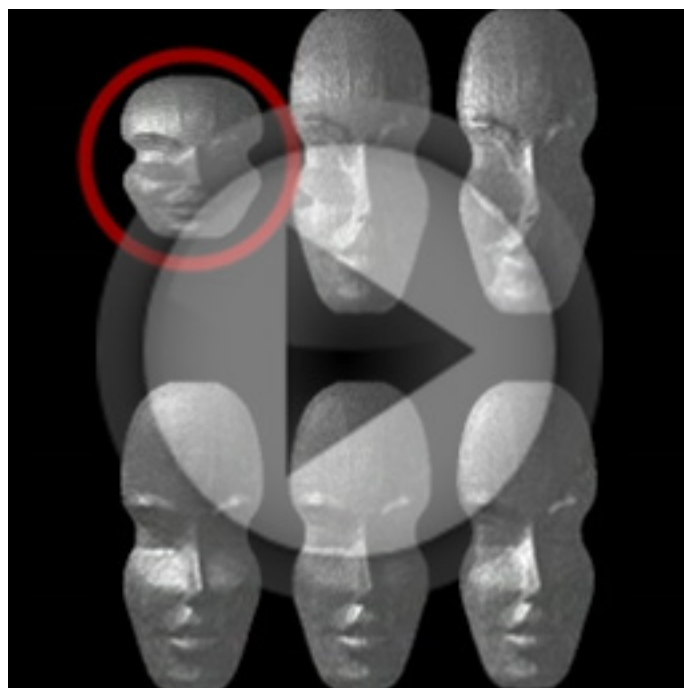
## "INCREMENTAL ROTATION X/Y/Z" CONTROLS

This will ROTATE each duplicates on its own X, Y, or Z axis. The further from the original Mesh, the rotation rate is also higher, thus there's no such a thing as a uniform rotation. Please understand this thing: "the furthestmost" from the original Mesh, is located in the furthestmost row AND furthestmost column AND furthestmost depth location from the original Mesh, essentially a diagonal depth distance from the original Mesh. NOTE: either the Spiral Rotation or the Incremental Rotation WILL NOT rotate/manipulate the original Mesh; it will stand firm like a rock, undisturbed.



## "UNIFORM SCALE X/Y/Z" CONTROLS

These will scale all your duplicate meshes, i.e EXCLUDING the original Mesh, on the horizontal, vertical, and depth axis respectively. Even the distance between Meshes is increased/reduced. And the scaling magnitude is all uniform, no longer dictated by distance from original Mesh. If each duplicate Mesh has protrusion/contour, the "Uniform Scale Z" will scale/stretch each of them in the Z axis, essentially stretching the protrusion; but if your Mesh is flat, of course it will stay flat; this control also increases/reduces the Z distance between duplicates, regardless of whether they're flat or not.







## “INCREMENTAL SCALE X/Y/Z” CONTROLS

These controls stretch/scale each duplicates in its own X/Y/Z axis; and regarding the Z axis its similar to the previous one (stretches the protrusions). But these controls do not manipulate the distancing between meshes; AND the further from original Mesh, the

scaling is also greater. As usual, the original Mesh is unaffected at all. Remember, since this is using the mesh’s own/local XYZ axis, if the orientation/facing of the mesh is changed, the axis will no longer conform to horizontal/vertical directions as normally.

## “RANDOM FACTORS” SUB-GROUP

This sub group will randomize the duplicates, either their Rotation, their Scale, their Distances between each other, or all of these at once; but as usual the original Mesh will not be affected at all. Let’s see all the controls here:

**01.** “Randomize Instance Offset” checkbox: Enabling this will randomize the distances between duplicates, essentially randomly positioning each one of them in space. Of course their facing/orientation

is unaffected, just their position. But you must realize that any Meshes that are located on the first column, including the depth grids on that column, will not be affected at all.

**02.** “Randomize Rotations” checkbox: Enabling this will randomize each Mesh’s rotation in all ITS OWN X,Y,Z axis. All meshes barring the original mesh will be affected.

**03.** “Randomize Scale” checkbox: This will randomly scale EACH mesh on ITS OWN X,Y,Z axis uniformly, i.e each mesh will have a uniform scaling in its own X,Y,

and Z axis thus preserving its original aspect ratio. All meshes, barring the original mesh, are affected; no change of distance between meshes.

**04.** "Randomize All" checkbox: This combines all the previous checkboxes, i.e randomizing Distance, Rotation, and Scale.

**05.** "Random Generator Amplitude": This controls the intensity/magnitude of the randomness. For example, if you randomize the Distance/Position between duplicates, then the greater this amplitude control, the greater the distance will be; if applied on Rotation,

**06.** "Random Generator Seed": Just type in a random number here, really anything random, to re-generate the randomness on the duplicates. For example, if you randomized the Distance/Position between duplicates, and you don't like the

**07.** "Random Statistical Model": Here, if you choose "Normal", the randomness ON THE WHOLE is rather wild. If you choose "Uniform", there will be

the greater the rotation will be, though not apparent since rotation is of course looping; and if applied on Scale, each mesh will be shrinking more or expanding more; a value of zero on this amplitude control means there's no randomization at all happening.

result because a certain mesh is too far away from other meshes, you can then re-generate the randomness so it results in mesh positioning that you like, ditto with Rotation & Scale.

some semblance of uniformity ON THE WHOLE, i.e each mesh will not have so vastly different of a change from the other one.

A very important thing to note, randomizing your duplicates using this sub group will only affect them ONE TIME for the initial state, and if you later keyframe/animate any of the usual Generator controls, such as the "Incremental Rotation" etc, no randomization will take place along the length of the animation. For example, you have randomized the duplicates using the "Randomize Rotations" checkbox, thus all the duplicates have different facing/orientation, and then you keyframe/animate the

"Incremental Rotation Z", now each of the mesh has a rotation animation on its own Z axis as usual, smooth rotation, no random jumping of rotation or change in direction, etc; but because each mesh has its orientation/facing changed (due to the Rotation Randomization), then the Z rotation is facing different directions for each mesh.

And another thing you have to know: even though you have wildly randomized the duplicates, they will still react normally to the Global XYZ axis when you manipulate these controls: “Grid Offset X/Y/Z”, “Spiral Rotation X/Y/Z”, and “Uniform Scale

X/Y/Z”. For example, however randomized the duplicates are, they ALL will still orbit/make revolution on the global X axis (vertical revolution) if you manipulate the “Spiral Rotation X”.

## “ANIMATION DELAY” SUB-GROUP



This group puts a “staggered delay” on the playback of animation, i.e if you have keyframed any of the “Generator” controls, OR, any of the “3D Transform” group controls. The “staggered delay” depends on the matrix/cubic array position of the mesh in relation to the Original Mesh as you already understood: the further away from Original Mesh, the greater the delay before the animation starts for that particular Mesh.

For example, you have keyframed the “Incremental Rotation Z” control, making each mesh rotates on its own Z axis; and then using the Animation Delay controls, you can make the duplicates nearest to the Original Mesh to start the rotation first, and the rotation will start later the further away from

Original Mesh. To help you wrap your brain on this feature: always first think in terms of the normal animation a control gives you, think how it will animate normally, and then apply the staggered delay on that normal animation; this concept applies to EVERY Generator controls that you already know.

This animation delay also applies to the controls under the “3D Transform” group. So let me explain this: if you use the “Generator” feature to duplicate your Mesh, of course the “3D Transform” controls still apply as usual. When you manipulate ANY of those controls, the transformation will happen as if ALL duplicates are a SINGLE big chunk of

object/mesh, with the anchor point located at the original Mesh. BUT WHEN you apply this “Animation Delay” to stagger the animation from “3D Transform” controls, the delay will happen per duplicate/per mesh basis as already explained before. See the video above for more clarity.

Now, let’s get specific to the controls there:

**01.** “Delay Seconds”: This control is pretty obvious, it sets the delay duration that each mesh suffers.

**02.** “Delay Transform”: Here you can tell FreeForm Pro what controls that you have keyframed, that you want to apply the staggered delay to. The options on this dropdown are all self-ex-

planatory, except the “Instance Offset” option; this option refers to the “Instance Increment X/Y/Z” controls that have been described some eons ago.

**03.** “Delay Axis”: This selects which axis of the controls that you have animated, that you want to be staggered, for example you have animated the “Spi-

ral Rotation” on the X and Y axis, but you want to apply staggered delay on the X axis only, then choose the X axis here.

**04.** “Animation Delay 1/2/3/4/5”: With these sub sub-groups, essentially you can apply up to five different “staggered delays.”

**05.** “Reverse Instance Order” checkbox: If this is enabled, the further away a mesh from the Original Mesh, the ear-

lier it’ll start the animation, thus the Original Mesh will be the last to animate.



Please note, since you’re delaying the playback of animation, of course some duplicates will not have completed the full animation when the CTI reaches the last keyframe of that Control that you animated. So to make these duplicates do the complete animation, you can let the CTI play beyond that last

keyframe and obviously some other duplicates will have stopped animating already because they start earlier. Once all duplicates have done their complete animation, they all will be in the state you’d expect from the normal animation without the staggered delay.

Remember: Most of the controls on the “Generator” group are keyframable, so after you have understood all the controls here,

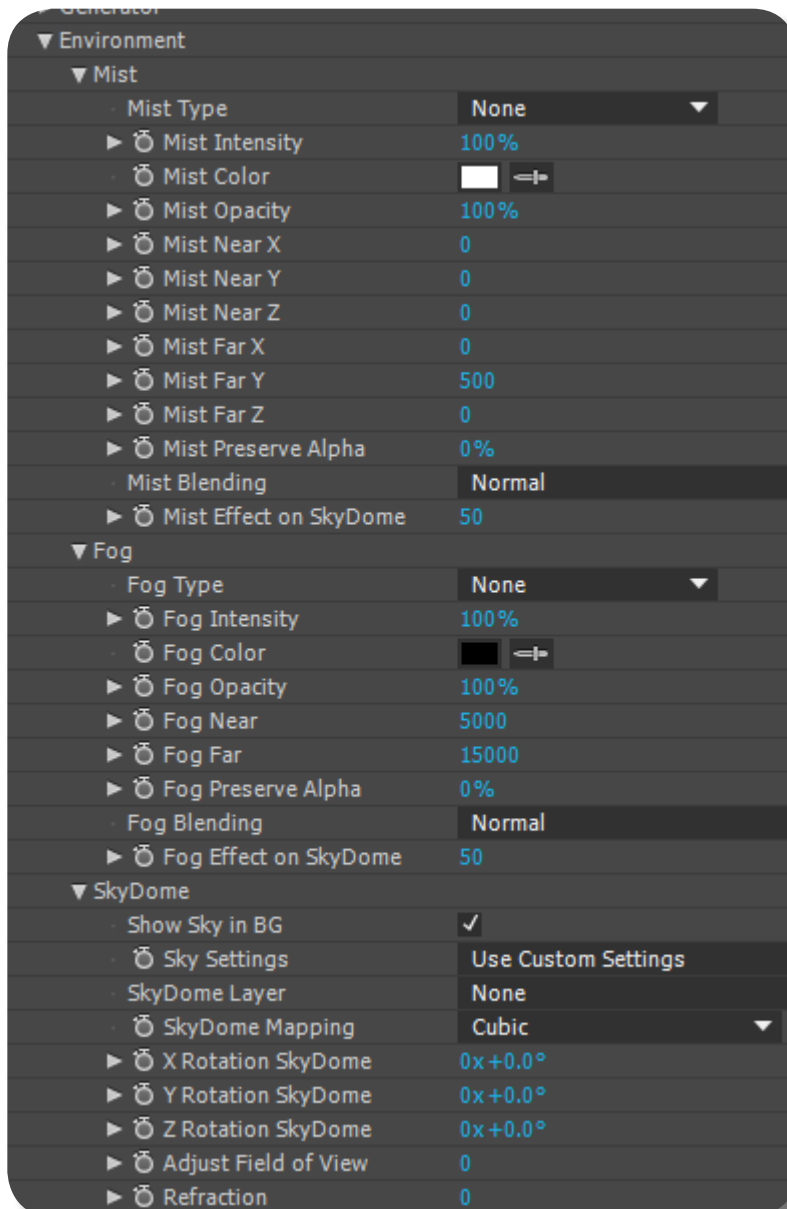
you can experiment with animating them to get crazier and more astonishing results!



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# CHAPTER 18:

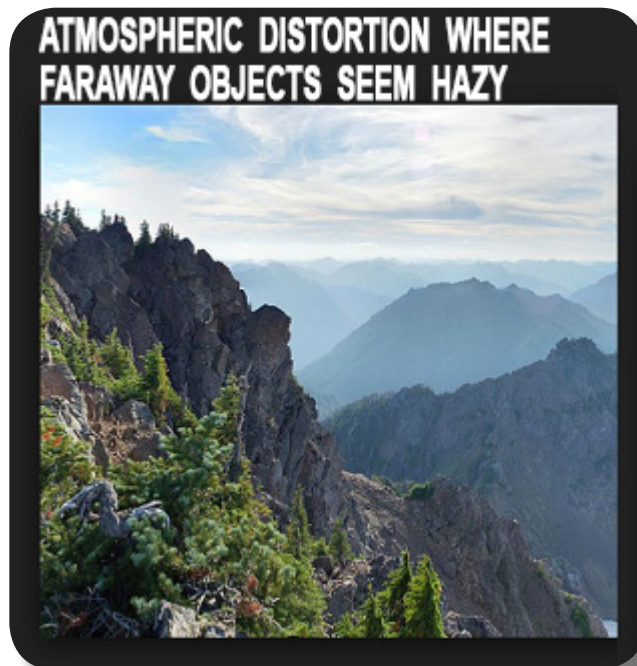
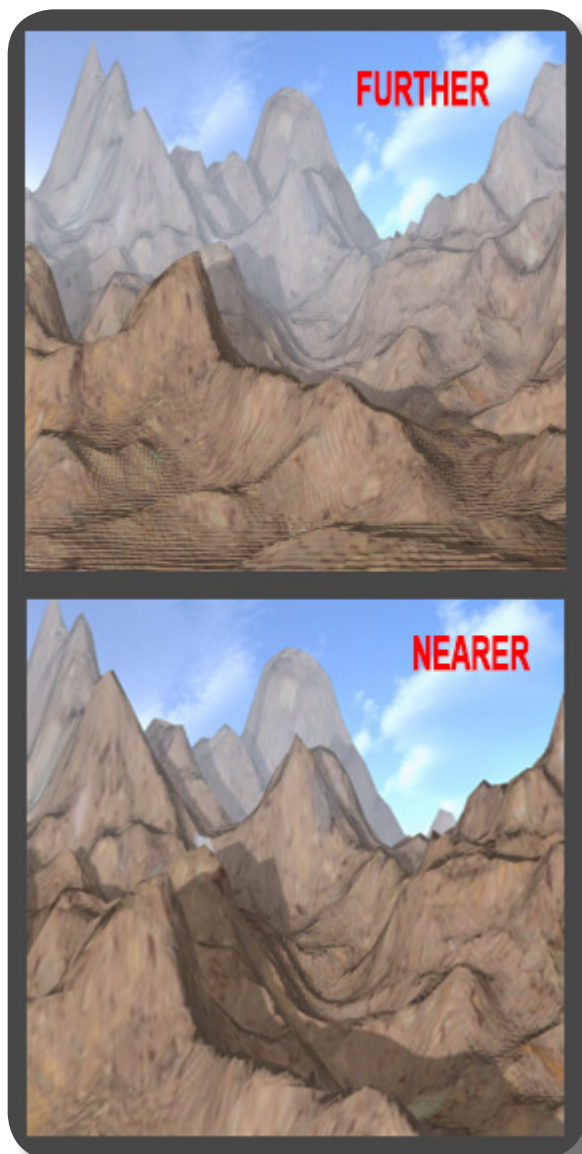
## The “Environment” Group



This is the last group in the long list of FreeForm Pro’s huge groups. “Environment” can be used to simulate the appearance of Mist and Fog (or atmospheric distortion) on your Mesh, or to create the appearance of “sky” that encompasses your Composition as a whole. This group is a perfect companion if you want to create land contour & terrain (or even water surfaces) using FreeForm Pro (see Chapter 1). Further details will be explained in the sections below.

## THE "FOG" SUB-GROUP

With "Fog" you can simulate the appearance of atmospheric distortion on your Mesh. You can think of this Fog as a general mist that encompasses the whole environment (i.e FreeForm's Mesh environment, including if you use Generator to enlarge that environment, BUT, excluding other AE objects of course).



As with atmospheric distortion in real life, wherever you view the Mesh, i.e rotating & moving the camera view, there's always that atmospheric distortion effect, because essentially the FOG has been created AROUND the Camera object and is made to FOLLOW that camera. If you move the Camera toward the Mesh, areas of the Mesh that were previously "fogged" have now become clearer, vice versa. This is in contrast to the "Mist" group (will be explained later) which will create a localized mist that is TIED TO A CERTAIN AREA OF THE MESH, NOT tied to the Camera itself; thus when you move the Camera object, the mist won't follow. NOTE: When you move the Mesh using the "3D Transform" group, it will also affect the Mesh clarity due to atmospheric distortion, similar to when you move the Camera.

So, let's explore all the controls & mechanism in this "Fog" sub group:

**01.** "Fog Type": This will define the appearance of the Fog, in connection with the Fog's "feathering" which will be explained later. If you don't "feather" your fog, changing this dropdown

won't have any effects. Don't worry too much about this control, so long as you set it **OTHER** than **NONE**, you'll have a fog; setting it to **NONE** means you're disabling the Fog altogether.

**02.** "Fog Intensity": Of course this will set the intensity or "thickness" of the Fog, thus your Mesh (and shadows cast on

it) will be obstructed even more by the Fog.

**03.** "Fog Color": Normally, if you want to simulate atmospheric distortion effect, you'll set the Fog's color to White (or

the color of the sky will do too). But of course, using this setting, you can set the Fog's color to whatever color you like.

**04.** "Fog Opacity": This is similar to the "Fog Intensity" control, i.e it will set the strength of the Fog's appearance, but with one big difference: the Mesh is also made transparent on the area where it is obstructed by the Fog, thus you can see through the Mesh toward the Skydome, or other AE objects.

**05.** "Fog Near" & "Fog Far": These will define the Fog's distance from Camera, and also define the Fog's feathering. With "Fog Near", you can push or pull the Fog's edge toward/away from the Camera. With "Fog Far", you can "feather" the Fog's edge appearance. If "Fog Far" value is **EQUAL** or **LESS** than "Fog Near" value, no feathering will happen, so it must be greater. And remember, just as with other "feathering", if it's set too high you'll render the Fog invisible because it has receded too far away from the Camera.







**06.** "Fog Preserve Alpha": This setting works in tandem with the "Opacity" material property. If you have set your Mesh to become transparent using the "Opacity" material property, this "Fog Preserve Alpha" will control THAT material property's Opacity ON THE AREA WHERE THE FOG OBSTRUCTS the Mesh. Low-

er percentage means that area is LESS influenced by the material property's Opacity, i.e more opaque, and vice versa. NOTE: when you set the transparency using either the "Fog Opacity" or the material property's "Opacity", please note that it's affecting only the Mesh, not the Skydome.

**07.** "Fog Blending": This will set the blending mode of the Fog (essentially the

Fog's color) AGAINST the Mesh and the Skydome.

**08.** "Fog Effect on Skydome": This will set the intensity of the Fog (essentially the Fog's color) toward the Skydome. This

setting works in tandem with the "Fog Intensity" control.

## THE "MIST" SUB-GROUP



"Mist" can be thought of as a local Fog, which is not stuck to the Camera but stuck toward some areas of the Mesh instead. Another difference with Fog is that Mist has some sort of "volume" to it, albeit not a real volume; you can see it by manipulating the position controls of the mist, i.e "Near X/Y/Z" and "Far X/Y/Z" controls, and you can see that the Mist is not only covering the usual horizontal x vertical surface of the Mesh but there's also "height" to it, i.e sometimes you can see the Mist--or rather the color of the Mist--not covering the whole height of a protrusion, but only the lower part of it. This is how it gives the illusion of "volume"; another way that it gives the illusion of volume is by applying the Mist color toward the Skydome, which is not only controlled by the "Mist Effect on Skydome" control, but by the positioning of the Mist itself, i.e "Mist Near" & "Mist Far" X/Y/Z controls. See the picture here for more clarity.



Explanation on the controls here:

- 01.** “Mist Type”, “Mist Intensity”, “Mist Color”, “Mist Opacity”, “Mist Preserve Alpha”, “Mist Blending”: These controls are similar to the ones found in Fog.
- 02.** “Mist Near X/Y/Z” and “Mist Far X/Y/Z”: These controls define the area that the Mist covers. Admittedly, these controls are rather confusing to use; just play with them until you’re satisfied with the area that the Mist covers. Please note
- 03.** “Mist Effect on Skydome”: Similar to the Fog’s one, but please remember that this control works in tandem with the “Mist Near” & “Mist Far” X/Y/Z controls to adjust the intensity of the Mist col-

though, that Mist area can also be controlled by moving/rotating the Mesh using the “3D Transform” controls; in actuality, the Mist is not really stuck to the Mesh but rather stuck to FreeForm’s 3D coordinate system.

or on the Skydome. If this control is set to zero, the Mist will not appear on the skydome no matter what controls & settings you use.

## THE “SKYDOME” SUB-GROUP



FreeForm’s “Skydome” is used for simulating the appearance of the sky, and as the name suggests it encompasses the whole Composition as a “dome”, i.e the Composition in which the FreeForm Mesh resides. So when you move/rotate the Camera around, you’ll always see the sky. Please note that the Skydome is not tied to the Mesh, i.e when you move/rotate/transform the Mesh using the usual “3D Transform” group, the Skydome is not affected at all. Also, when you truck your Camera in/out of the Mesh, the Skydome will not be “zoomed in”, only the Mesh, BUT when you ROTATE the Camera of course the Skydome view will conform to the rotation.

Explanation on the controls here:

- 01.** “Show Sky in BG”: this checkbox will enable or disable the Skydome.
- 02.** “Sky Settings”: If you set this dropdown to “Use Reflection Map Settings”, then the layer that will become the SkyDome is actually the same layer that you use as the Reflection Map; also you will be manipulating the SkyDome using the controls at the “Reflection Mapping” group, thus your Reflection Mapping and your SkyDome will both behave the same way and at the same time; for example when you manipulate Rotation controls on the “Reflection Mapping”
- 03.** “SkyDome Layer”, “SkyDome Mapping”, “Rotation SkyDome X/Y/Z”: These controls will be activated if you choose the “Use Custom Settings” from
- 04.** “Adjust Field of View”: This will distort the image of the Skydome layer, essen-
- 05.** “Refraction”: Before you use this control, you have to reduce the Opacity of your Mesh using the material properties’ “Opacity” control; if you don’t do that, this control will not have any effects.

group, the SkyDome will also be rotated the same way, thus creating the illusion that the Mesh is actually reflecting from Skydome; this is perfect for giving the illusion of “environment reflection”. If you set this “Sky Settings” dropdown to “Use Custom Settings”, then you can define your own SkyDome layer and settings separate from the “Reflection Mapping” group; the actual SkyDome controls here are similar to the “Reflection Mapping” controls.

the “Sky Settings” dropdown, as previously described. These controls are similar in function to the ones found in the Reflection Mapping group.

tially making the image/texture of the SkyDome to appear zoomed-in/out.

This “Refraction” control will “bend” or distort the appearance of the Skydome if seen THROUGH that transparent Mesh. Perfect for simulating underwater view toward the sky.

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# PART 3:

## TIPS, TRICKS, AND NOTES

In this Part, we will explore miscellaneous details about FreeForm Pro, along with some complementary techniques that will be useful when you're using this Plug-in. Let's go ahead!



# CHAPTER 19:

## Miscellaneous Notes

In this chapter, we will discuss miscellaneous topics related to FreeForm Pro. Some of these topics are really important to know so

you don't blunder around when using this Plug-in.

### DISTORTED APPEARANCE OF THE LAYER

Remember, because FreeForm Pro distorts your layer in 3D space, the Mesh texture appearance even in orthographic Front View will be altered, because obviously there is bound to be some image areas that need to be stretched to accommodate for the 3D

contour. There are some smart tricks that you can use to alleviate this problem, such as using the "Displacement" control from the "CC Glass" effect (with the exact same Displacement Map layer set as the "Bump Map" layer).

### SETTING UP LIGHT & CAMERA BEFORE ANYTHING ELSE

A good workflow when working in 3D with FreeForm Pro is to always create three things before anything else: (1). Create an "Ambient" light for the base lighting of the entire Mesh; set its intensity to 33%. (2). Create a "Point" light for the main lighting; set its in-

tensity to 100%. (3). Create a Camera Layer. You always need a Camera layer when using FreeForm Pro, so you can rotate the view around the 3D Mesh.



## LOCKED SCALE & ROTATION PROPERTIES

The layer that you apply FreeForm Pro to, will have its actual AE Scale property locked to 100%. So either you manipulate the Scale before or after you apply FreeForm Pro, it will always become 100%. Of course the

solution is to scale the layer and then Pre-comp it before applying this effect. NOTE: this also happens to the Rotation property of the layer, in which it's locked to 0 degree.

## PRECOMPOSE THE PUPPET TOOL BEFORE APPLYING FREEFORM PRO

When you use the Puppet Tool on your layer (usually for character animation), you must collect that layer and all related character-rig layers (Bones, Nulls, Controllers) into a Pre-composition before applying the FreeForm Pro effect to achieve the 3D look. If you just

apply the FreeForm Pro effect right on the layer where you put the Puppet Tool, it will crazily destroy your whole rig, even AFTER you DELETE the FreeForm Pro effect from that layer.

## FAKING THE 3D APPEARANCE WITHOUT FREEFORM PRO

Sometimes, instead of using FreeForm Pro, you can fake the appearance of 3D by staggering your AE 3D layers in the Z axis so when the camera rotates there will be apparent parallaxing. You can use this technique when

doing Character animation, for simple body parts such as hair, in which you separate the hair into multiple 3D layers and then stagger them in Z axis.

## REGARDING THE "CUSTOM VIEW" MODES WHEN VIEWING THE MESH

Unlike normal 3D AE layers, you CAN NOT use the "Custom View" modes (at the bottom of the Comp panel) for viewing around the FreeForm's mesh UNLESS YOU HAVE CREATED a Camera Layer on that Composition. If you haven't created a Camera

layer, the Custom View mode will only see the original un-deformed 2D appearance of that Mesh layer (can not even rotate the view around). After you have created a Camera layer, you can use the Custom View normally.



## RAM-PREVIEW ODDITY WHEN USING FREEFORM PRO

This is a rare occurrence, but sometimes doing RAM preview with animation done using FreeForm Pro will have some weird visual result, thus you have to clear the AE

cache completely (using the “All Memory & Disk Cache” option, anything less will not do) and then re-do the RAM Preview.

## WHEN PANNING AROUND THE COMP VIEW USING SPACEBAR

If you want to pan around the Comp view using Spacebar, do not initially place your cursor on any of FreeForm Mesh’s vertices,

because instead of moving around the Comp view you’ll drag that vertex point.

## MULTI-PROCESSING DISABLED WHEN USING FREEFORM PRO

If you’re using FreeForm Pro, multiprocessing ability in After Effects is disabled (e.g for RAM previewing), because it is an effect that uses GPU-processing. Because if a Composition happens to contain an effect that utilizes GPU processing, multiprocessing feature will be disabled for that Composition. So you’re better off using the Spacebar for RAM Previewing instead of the 0 Numpad key. But don’t worry, because GPU processing is mightily a lot faster than CPU multi-core processing. On a side note, it seems that the FINAL render in AE is done on the CPU (thus the GPU processing in FreeForm Pro is only good when working on the Comp panel), except if your Composition uses the Ray-Traced 3D engine in which it

will use the CUDA resources of the GPU to do the FINAL render. Maybe it’s a lot faster to render the final output using Raytraced 3D Renderer engine enabled. But one thing for sure, the Raytraced 3D Renderer engine is limited and can’t do a few things that the normal renderer can (you can see what are the limitations by looking at the dialogue box that pops up when you first switch the Composition renderer to Raytraced 3D). If you want to use this renderer though, please remember to include at least one 3D object on your scene, such as 3D layer, or a light layer, camera, etc, because FreeForm Pro’s layer is still considered 2D by AE in this regard.

## FREEFORM PRO'S 3D SPACE IS SEPARATE FROM AE COMP'S 3D SPACE

The 3D space of FreeForm Pro's Mesh is broken/separate from the 3D space of the AE Comp, because layer ordering & overlapping on the Comp view is not normally as it should. You can see this for yourself, when you rotate the Camera to view 3D layers that are "behind" or "in front" of FreeForm Pro's Mesh, these layers will always be either

in front or in back of the Mesh depending on their ordering in the Timeline panel. There are tricks that can be used to solve this problem, as you can see in the video in Chapter 1 about "Full Volume FreeForm Pro Object", although discussing such tricks is beyond the reach of this book.

## PRECOMP'S CAMERA LAYER FOR VIEWING THE MESH

If you Precomp the FreeForm Pro's Mesh, the Mesh will no longer be affected by the Main Comp's camera or light layers, even after you turn ON the "Collapse Transform"

switch for that Precomp layer. It can only be affected by the Camera & Light layer inside of that Precomp.

## IF AFTER EFFECTS SLOWS DOWN WHEN WORKING WITH FREEFORM PRO

If you're feeling slowdown when working with FreeForm Pro, you can save your Project and then restart After Effects, and

the speed will come to normal again (speedier process). Preferably you must clear your RAM and Disk caches as well.

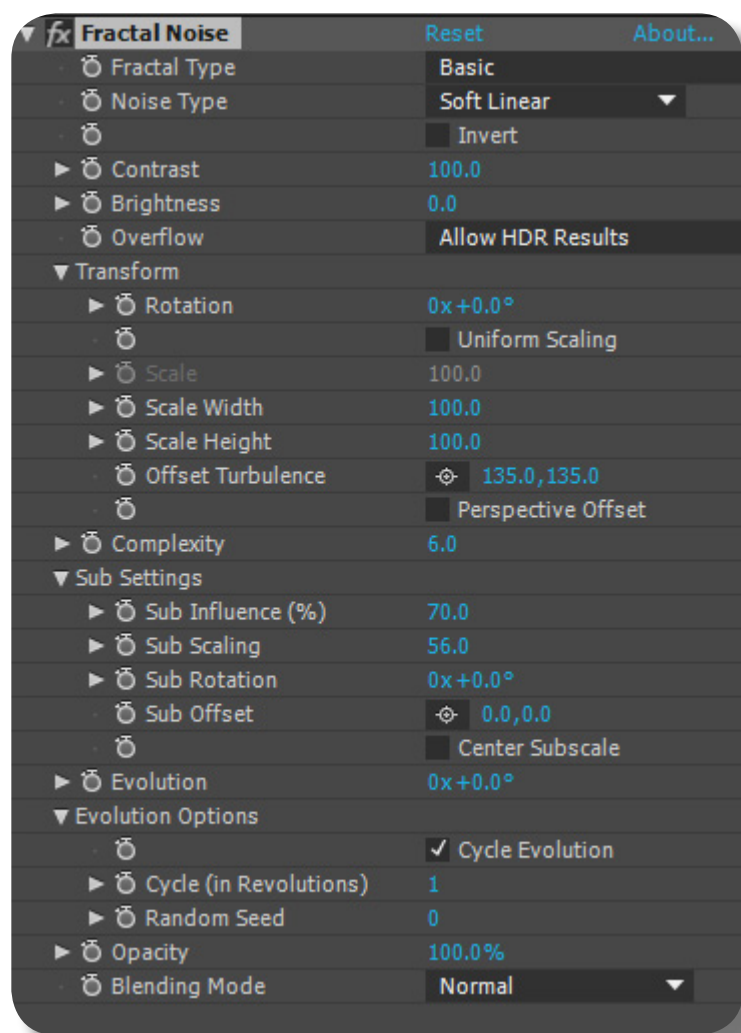
## APPLYING CHANGES/EFFECTS TO THE ORIGINAL MESH LAYER

The layer that you apply FreeForm Pro to, does not need to be Precomped if you want to apply changes to it such as applying Effects, or Paint tool, so long as the Effects are applied ABOVE FreeForm Pro in the Effect Controls panel. FreeForm Pro will recognize these changes. The exception would be, as

already explained sometime ago, the Rotation and Scale properties of that layer, because they are locked to 0 degree and 100% respectively. This is in contrast to how you must Precomp your Displacement Map layer or the Reflection Map layer if you applied changes to them.

# CHAPTER 20:

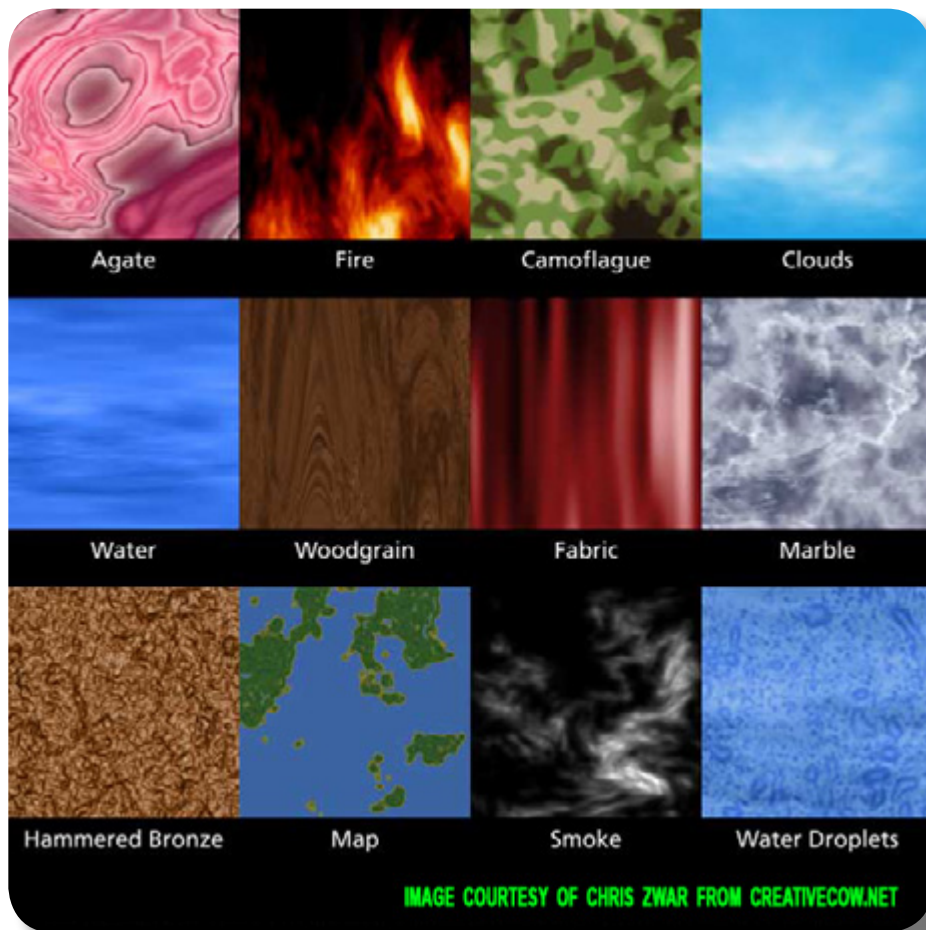
## Fractal Noise for Texture & Displacement Map



In this chapter, we will discuss specifically an Effect separate from FreeForm Pro, that is, the “Fractal Noise” effect. You can find this effect from the “Noise & Grain” category -> “Fractal Noise” from the Effects & Presets panel. This Effect is mightily important when you’re creating computer-generated graphics, either in After Effects, Photoshop, or other programs related to computer-generated graphics.

The “Fractal Noise” effect can be used to generate a huge range of organic textures and patterns, such as wood grains, fabric, fire, water, clouds & mist, marble, camouflage, and of course some abstract imagery. In essence, this Effect helps create that organic look on your otherwise too sleek & clean CGI images. In regard to FreeForm Pro, this Effect can be utilized on both the Mesh texture and the Displacement Map lay-





Most images in this chapter are courtesy of Chris Zwar (chris@chriszwar.com) from CreativeCow.net.

er; for the texture it gives that organic appearance, and for the Displacement Map, it gives that organic protrusions on your 3D Mesh (either for Terrain generation, Water surface, billowing Cloth, creature skin, or abstract motion graphics).

The “Fractal Noise” principle, also called by its other name “Perlin Noise” (named after the inventor), has been widely used in blockbuster movies and computer games. Most real world applications of this effect use it in tandem with other effects, such as being used as a Displacement Map data, or, colored with other effects such as Tritone or Colorama, to achieve outstanding visual results; the possibilities are endless with this effect.

## GENERAL MECHANISM OF THE FRACTAL NOISE

So, let’s jump in on the general mechanism: this effect is applied on any kinds of layer, and normally it will replace the original image appearance of that layer with the texture/pattern generated by this effect, and that texture is bound by the shape/alpha of

the original layer. This effect generates grayscale texture image, and this grayscale data are then used as a foundation for other effects, such as for Displacement Map data, or simply being colored by colorizing effects such as Colorama, Tritone, or Tint, etc.



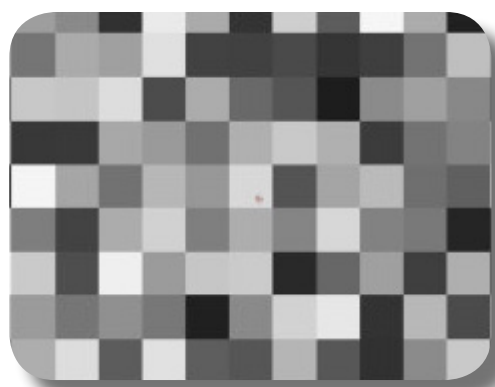
The most important thing when using this Effect: since this effect essentially generates an endless possibility of “RANDOM” texture or pattern imagery, you must also use it with random methods. There are no set specific techniques & controls that you must do, just experiment with it wildly. Of course some of the mechanism & controls explained

here will help you better control the result, but generally it’s trial & error. So, let’s jump in with the actual controls there, but please note we won’t discuss it in order. We will discuss it from the most important controls first so you can have a good understanding of how it works!

## “NOISE TYPE” CONTROL

This control defines the interpolation/tweening between the random values on the grid. Let me explain: first of all, you have to understand that this effect in its basic operation, generates a set of random grayscale

values, and these values are distributed in a sort of two-dimensional grid, i.e rows and columns, so that normally these random grayscale values have uniform distance between them.



To easily understand this effect, let’s set this “Noise Type” to “Block”, and another control, “Complexity”, to a value of 1. Thus you can see the random grayscale values are distributed in a pattern of clearly distinguished blocks. This type of “Blocks” interpolation/tweening between values, is sort of the “Hold keyframe” if you’re familiar with AE keyframe interpolation, where there is no interpolation or tweening between each grayscale values. Each grayscale value is just duplicated for every pixel and extends toward the boundary of the next grayscale value.

Now, if you set the interpolation to “Linear”, you begin to see that the values are tweened. The tweening between one grayscale value to the next one is linear, e.g from a grayscale value of 23 to a value of 55, the pixels in between are applied the values of 24, 25, 26, ..., 52, 53, 54. The next option, “Soft Linear” is even softer and gradual than the Linear method as you can see in the resulting imagery; and the next one “Spline” is about the softest & smoothest interpolation method between values.

**BLOCKS:**



**LINEAR:**





## “CONTRAST” & “BRIGHTNESS” CONTROLS

These controls define the “range” of the random grayscale values, i.e the minimum & maximum boundary of the grayscale value to be randomized. Think of “Brightness” as

the GENERAL luminance value that the entire grid will be BASED on, and the “Contrast” as the range/diversity/tolerance allowed from that GENERAL luminance value.

## “INVERT” CONTROL

This will invert each grayscale values, to become the opposite of that value. So for example, a value that is dark gray now becomes light gray, etc.

## “OVERFLOW” CONTROL

Since the values are randomized, there is bound to be overshoot, i.e exceeding the pure white or pure black values, so this control serves to “remap” these exceeding values back into the range. If you choose “Allow HDR Results”, no such remapping will happen, and those exceeding values are preserved. “Clip” will convert those exceeding values to either pure black or pure

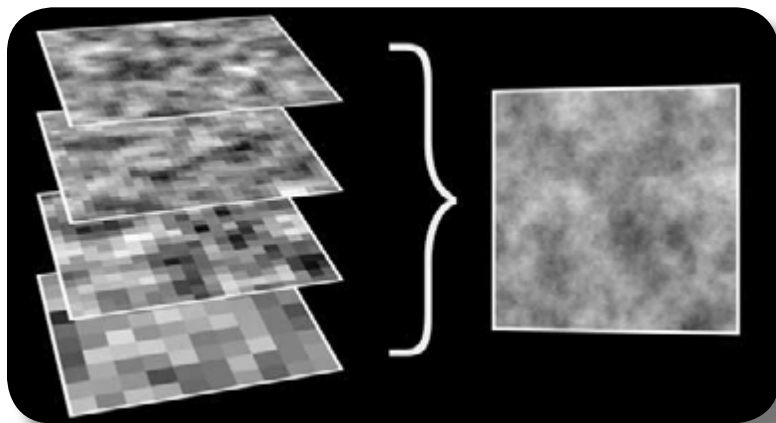
white, thus the resulting imagery is more of a uniform grayscale. “Soft Clamp” will bounce back those exceeding values in a curve, so they stay in range, and the resulting imagery is a more subtle grayscale values. “Wrap Back”, apparently this is similar to the previous one, and the resulting imagery is a more detailed & diverse grayscale values.

## “FRACTAL TYPE” CONTROL

This is about the different types of mathematical formula used in GENERATING and DISTRIBUTING the random values on the grid. NOBODY can exactly tell which option does what texture, since the resulting randomization will always be further ma-

nipulated using other controls, causing the result to become completely different from its inherent characteristic. Just use any of the types here in tandem with other controls to produce wildly different texture/pattern imagery.

## "COMPLEXITY" CONTROL



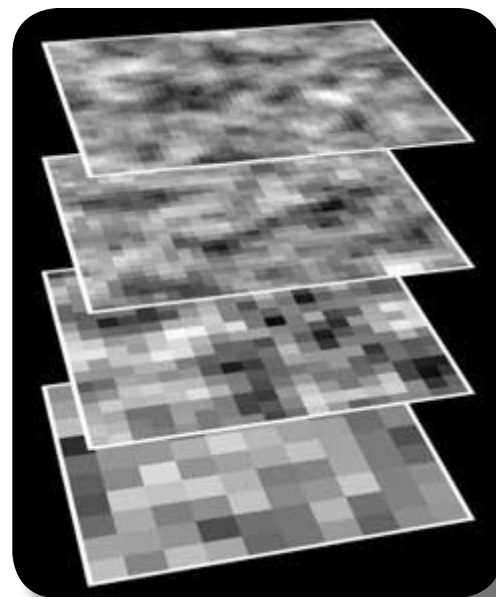
Now that you have understood the most basic premise of this effect, i.e. A SINGLE GRID of random gray-scale values that have interpolations between them, and also a pattern on the randomization; it's time to know that instead of a single such grid, you can have multiple of similar grid stacked in layers, one on top of the other. This "Complexity" control does exactly that, to define how many "layers" of such grid.

This duplication & layering of the pattern is actually the very essence of the "fractal" principle. The more the layers, the more complex & detailed the texture image will look like. Let's call the subsequent grids, i.e. the grids created after the primary one, as "children" grids.

## "SUB SETTINGS" SUB-GROUP

This sub-group controls those children grids (also known as "Subs"), either their opacity, scale, rotation, or position, IN RELATION TO THE PREVIOUS GRID. That is, each of these controls works IN SUCCESSION/STAGGERED from the topmost layer, in relation to the layer beneath it, all continuing until the bottommost & primary grid, which means that this primary grid is not affected at all by these controls.

For example, as you can see in the picture here demonstrating the Scaling of these children grids: The bottom-most layer has the biggest Blocks, and continuing upward the Blocks size becomes smaller and smaller.



**01.** “Sub Influence” controls the visibility, much like controlling Opacity, of these children grids; as already described, it works in succession, i.e the opacity of

the upper layer in relation to the layer beneath it, all continuing down until the bottommost grid.

**02.** “Sub Scaling” of course resizes each children grids, either enlarging or shrinking them, and as usual the scaling also happens staggered/in-succession, which means if you have so many layers and

the scaling of shrinking is too extreme, those layers at the upper area will not be visible at all because they have become too small/invisible.

**03.** “Sub Rotation”, of course rotates each grids in relation to the previous grid.

**04.** “Sub Offset” lets you reposition those children grids, i.e their X & Y position, NOT their layer ordering; again in relation to the previous grid. There’s ac-

tually a Pin Point control that lets you set the position interactively from the Comp panel.

**05.** “Center Subscale”, turning this checkbox ON causes the scaling of the children grids to be uniformly centered. This helps when you’re scaling them, because while you crank the “Sub Scaling” control, the appearance on the Comp panel is regu-

lar & predictable, not too jumbled as in turning this checkbox OFF. IMPORTANT NOTE: if you set “Sub Scaling” to 100, all layers including the primary one will have the same size.

## “TRANSFORM” SUB-GROUP

This sub group will rotate, scale, and reposition all the layers at once; remember, NOT all layers as a WHOLE/SINGLE solid entity, NOR in succession/staggered as in

the previous group, but EACH layer has its own rotation/scaling/positioning and the magnitude is the same for each layer; the bottommost/primary layer is also affected.



Actually this group is nearly similar to the “Sub Settings” group, except that it’s NOT doing the transformations “in relation to the previous layer”. Regarding scaling, you can actually scale differently in the X and Y axis, by turning OFF the “Uniform Scaling” checkbox and then use the “Scale Width/Height” controls there; the axis used for this

scaling is the global axis, i.e width scaling is always your left-right axis, and height scaling is your vertical axis. This non-uniform scaling is pretty powerful because it allows you to achieve some textures/patterns that are otherwise not possible, just experiment with it.

And then regarding “Offset Turbulence”, instead of repositioning/moving the layers normally, i.e they have their own positioning, you can position all of them at once as a single solid entity by turning OFF the checkbox “Perspective Offset”. And doing

so is actually very powerful because you can use this “Offset Turbulence” control to move the entire texture around to find exactly the spot that you want. Panning around the resulting texture should be your standard procedure when working with this effect.

## “EVOLUTION” CONTROL

This control lets you animate the resulting texture imagery. Essentially this control gradually changes the luminance of each grayscale values on the grid, thus changing the luminance appearance of the texture BUT NOT THE PATTERN itself. The pattern of the texture depends on the “Fractal Type”

control that you have chosen. So if you want to animate the Fractal texture, use this control as the primary animation control, although of course, you can animate the controls under “Sub Settings” and “Transform” too.

## “EVOLUTION OPTIONS” SUB-GROUP

Under this sub group, you can set a looping to the “Evolution” animation described before, so instead of an always changing imagery without any possibility of looping, you can set the animation to loop after a set revolution of the previous “Evolution” control. To achieve this, you must turn ON the checkbox “Cycle Evolution”, and then

set how many revolutions happening on the “Evolution” control before the animation loops, by going to the “Cycle (in Revolutions)” control. For example, setting a value of 2 on the “Cycle” control, the animation will loop if the “Evolution” control reaches the value of “2x + 0.0”, and then “4x + 0.0”, and then “6x + 0.0”, and so on.



## **“RANDOM SEED” CONTROL**

This is the normal “Seed” control that you’re already familiar with; just input any random numbers here to generate a new randomness for your entire resulting texture. Of course it doesn’t mean randomizing the controls’ values that you have set (the randomization will be bound within those values). This

is useful, for example, if you have nearly achieved the texture/pattern that you want by playing with the controls, but still can’t get the exact texture that you REALLY want, thus you randomize the result again to see if you have a luck in getting that exact one.

## **“OPACITY” CONTROL**

This reduces the opacity of the resulting fractal image, thus revealing more and more the appearance of the original layer that you applied this effect to.

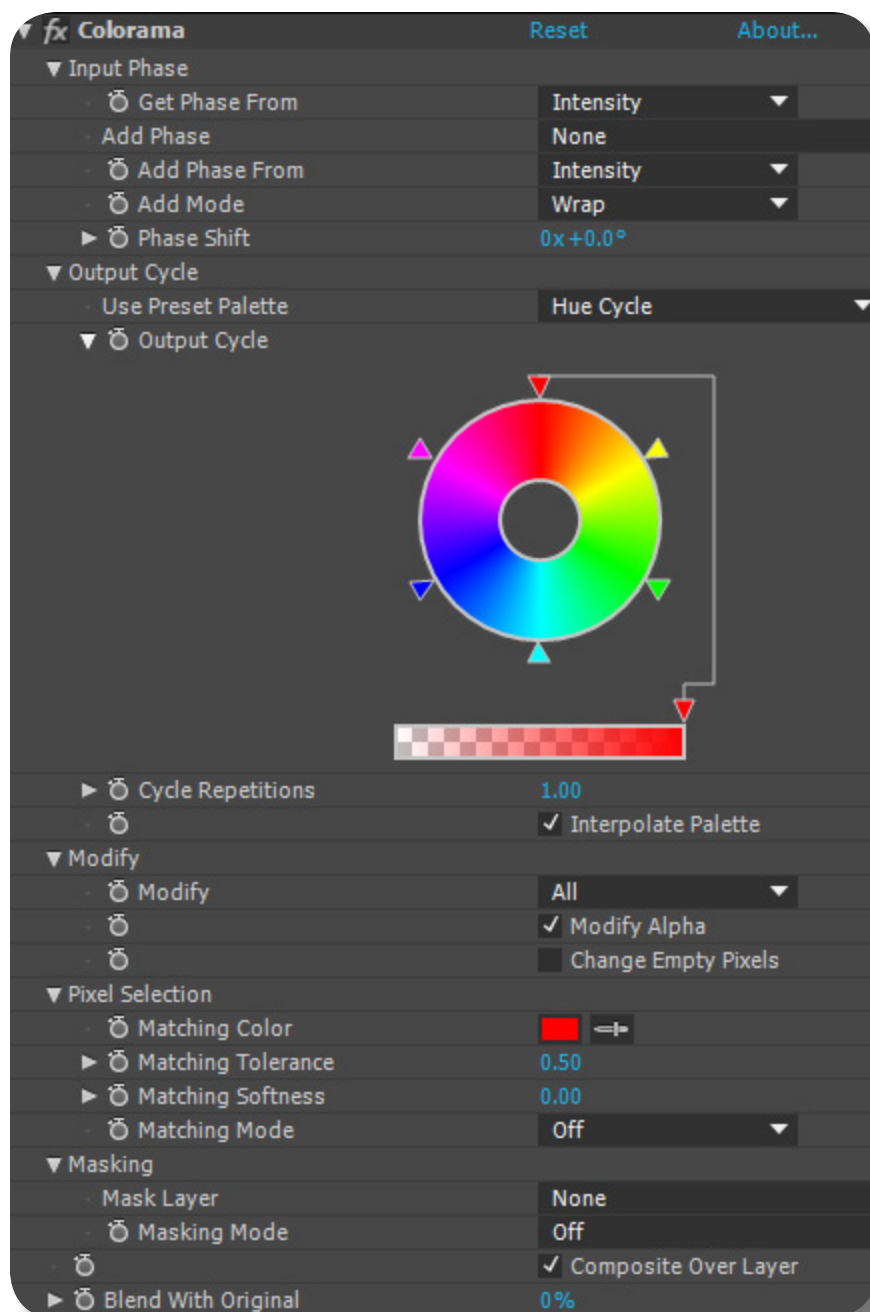
## **“BLENDING MODE” CONTROL**

This sets the blending mode of the resulting fractal image against the original layer. There is one thing that you have to know though: if you set the blending mode to NONE, only

the fractal image will be rendered/visible, not the original layer, thus if you have reduced the Opacity from the previous control, none of the original layer is visible.

# CHAPTER 21:

## The Colorama Effect



Because we have already discussed the Fractal Noise in Chapter 20, it's really incomplete if we don't discuss a colorizing effect, because colorizing the grayscale texture from Fractal Noise is really the most common workflow after creating the fractal texture/pattern. By colorizing the grayscale fractal texture, you can use it for practical purposes such as giving an organic texture appearance to your FreeForm Pro's Mesh; if it's still grayscale, it's only useful for Displacement Mapping.

The "Colorama" effect can be found under the "Color Correction" category from Effects and Presets Panel. You can actually use simpler colorizing effects such as "Tritone" or even "Tint" to do the colorizing job, but because "Colorama" is very versatile, powerful, and complete, we'll discuss this effect instead. Let's discuss its mechanism and controls; groups & controls may not be explained in-order.

**01.** First of all, of course you apply Colorama to a layer. This layer's imagery will then be converted to grayscale imagery, conforming to the attribute you set on the "Get Phase From" dropdown menu. For example, on that dropdown you choose "Intensity", then, the original layer will be converted into grayscale imagery based on the original layer's Luminance. Another example, if you choose "Red" from this dropdown, then the resulting grayscale will be based upon the intensity of the Red channel on each pixels of the original layer, as usual you can monitor the intensity using the Info Panel. The more the original pixel conforms to the attribute you

have set, the more it is colored white on the grayscale imagery, so a Red value of 1 on the Info Panel will be colored pure White on the resulting grayscale, ditto with other attributes. If your original imagery is already grayscale/BW, such as from Fractal Noise effect, usually you want to choose either "Intensity" or "Lightness" from this dropdown. You can also choose "Alpha" if you want to make the resulting grayscale to be based on the Alpha intensity of the original layer. AND PLEASE NOTE that this grayscale imagery is created **BEHIND THE SCENE**, i.e you can't see it at all; it is used internally by Colorama.

**02.** After the original imagery has been converted into grayscale/BW, it's time to "map" that grayscale imagery into the color wheel of the Colorama effect, thus producing the final colored result. You can find that color wheel on the "Output Cycle" control, under the "Output Cycle" group. What happens on the "mapping" process is this: the black pixels on the resulting grayscale imagery is converted/mapped toward the COLOUR of the triangle located at the wheel's twelve-o'clock; and then, the further away from black the pixels are, in other words, the whiter they are, the further away they'll be mapped from that twelve-o'clock triangle, going clockwise until it reaches **JUST ABOUT** the twelve-o'clock area again. Thus the pure white pixels on the grayscale imagery, will be converted to the color **JUST TO THE LEFT** of the twelve-o'clock tri-

angle. Now, regarding this color wheel, you can actually manipulate it however you want: to change the color of a triangle, double-click the triangle; to move the triangle, drag the triangle around the wheel, you can also use Shift key to snap the movement to 45 degree angle; to duplicate a triangle, including its color content, press Ctrl key while dragging a triangle; to create a new triangle, click anywhere inside the wheel and choose the triangle's color from the color-picker that pops up; to delete a triangle, drag and move it away far from the wheel. At the bottom of the color wheel there's a "transparency bar", and it will reduce the opacity of a triangle's color thus revealing the original layer's imagery on that area where the triangle's color happens to be; but this transparency won't be realized until you turn **ON** the "Modify Alpha" checkbox under the "Modify"



group. PLEASE NOTE that you can key-frame/animate the color wheel, i.e the “Output Cycle” control, and what will be recorded are the triangles’ colors, i.e the change in colors, and, the change in position of the triangles; but normally, if you want to animate the colors, thus each grayscale value experiencing different colors from the wheel, you should animate the “Phase Shift” control instead, which will be explained later.

**03.** Instead of manually manipulating the color wheel, you can use pre-made color wheels, by going to the “Use Preset Palette” dropdown and choose

from the Presets there. For example, in creating a fire texture from the Fractal Noise effect, you can select the “Fire” preset from here.

**04.** On the “Cycle Repetitions” control, you can duplicate the color wheel on its entirety, from 0 to 360 degree again, and the duplicate will be placed AFTER the last color of the first wheel, essentially compressing/crowding two color wheels into one. This means that the

grayscale imagery MAY HAVE repeating colors as the result. Please note that you can actually set this “Cycle Repetitions” to a fraction value, i.e not necessarily duplicating the WHOLE color wheel but only a part of it.

**05.** “Interpolate Palette” checkbox will define whether there is tweening between triangles’ color, i.e gradual color change from one triangle to the next. If you uncheck it, there will be no such transitions, i.e each triangle will have a set & clearly

defined boundary of its own color, and this results in a “posterized” final image, i.e you can see clearly the “color bands” on the resulting image, because there’s no gradual transition of colors.

**06.** Now, let's go back to the top controls again. Instead of the black pixels of the grayscale image to be always mapped toward the triangle on the twelve-o'clock, you can "shift" it so that the entire mapping begins from another triangle, by using the "Phase Shift" control under the "Input Phase" group. For example, the black pixels are now being mapped to

the triangle at four-o'clock, consequently the entire mapping is shifted, thus the white pixels will be mapped toward the area **JUST TO THE LEFT** of the four-o'clock triangle. As mentioned earlier in number two, you can keyframe/animate this "Phase Shift" control to animate the changing of colors for each grayscale values.

**07.** Now let's discuss again the previous resulting grayscale imagery: instead of only using the original layer's imagery as the basis for the grayscale result, you can actually **ADD ANOTHER LAYER'S** imagery, so that the two layers combined will

become the resulting grayscale imagery. You add such layer by using the "Add Phase" dropdown; simply select another layer from there. **NOTE:** the new layer's imagery will be resized to fit the original layer.

**08.** And then using the "Add Phase From" dropdown, you can select which attribute of that newly added layer that you want to use as the grayscale, similar to

the "Get Phase From" dropdown, i.e you choose whether to use its Red channel's value as the basis for the grayscale, or its Luminance value, Alpha value, etc.

**09.** Now we have two grayscale imageries, and since they are supposed to be combined, you have to decide how the combining process takes place, using the "Add Mode" dropdown: "Wrap" will add the two values, and if an overshoot happens (going overbright/over-white), the value will be returned to zero and increased from there using its remaining value, for example a value of 125% will become 25%. "Clamp" is similar to the previous one, i.e adding the two values, but if an overshoot happens, the value will be clipped to 100% no matter

how much the overshoot is, thus being pure white on the resulting grayscale. "Average" will of course average the two values, i.e adding them and then dividing by two, thus there will never be overshoots happening. "Screen" is similar to the Screen blending mode, i.e any weak value from that new layer will be discarded, but any strong value will be **ADDED** to the original layer; as you already know, Screen blending mode is good for compositing a footage that has bright object but dark background such as a Fire object on a dark background.



**10.** Please note that instead of combining the two layers, you can solely use that newly added layer as the basis for the grayscale data, by choosing “NONE” from the control “Get Phase From.”

**11.** From the “Modify” group: the “Modify” dropdown menu should **ALMOST ALWAYS** be set as “All”. And then there’s the “Modify Alpha” checkbox: generally you want this to be **TURNED OFF**, as turning it **ON** will cause jagged edges (as if not anti-aliased) on the outline/edge area of the original layer if it has pure Alpha/shape there, thus the color on those outline/edge areas will appear jagged. Turning it **ON** will also cause semi-transparent area of the original

**12.** “Change Empty Pixels” will disregard the shape of the original layer, i.e shape due to perfect Alpha/hole, thus colorizing over the whole layer’s boundary. This checkbox will not have any effects

**13.** Let’s move on to another topic: isolating the final result of the Colorama effect to only certain **COLORS** of the **ORIGINAL LAYER**; remember, **ONLY** the **ORIGINAL LAYER**, not the combination of the two layers as already discussed. So let’s get this straight: you have a colorful image -> the image is converted to grayscale based on a certain attribute -> the resulting grayscale is mapped toward new colors based on Colorama’s color wheel -> thus the entire layer is mapped toward these new colors. **NOW**, if you want Colorama to paint **ONLY** a “certain area” of your layer, instead of the normally “entire area” of your layer, and that this “certain area” is based on a

Thus you have rendered useless the imagery of the original layer that you applied Colorama to; only the layer’s shape/Alpha is useful now.

layer to become painted over with the Colorama’s colors, thus no transparency at all on that area. The only time you want to turn this checkbox **ON** are two: if you have set any triangle to have transparency by using the transparency bar on the color wheel as already explained in point No. 2 above; and, if you want to use the “Change Empty Pixels” checkbox, which will be explained next.

unless you also turn **ON** the “Modify Alpha” checkbox; thus essentially this checkbox will disregard **ANY ALPHA** on the original layer, even semi-transparent areas.

certain color of your original layer, thus any layer’s areas not containing that color will retain its original appearance instead of being painted by Colorama, you can use the “Pixel Selection” group to achieve this. Using the “Matching Color” control, you can set such color that will be affected by Colorama; you can actually turn **OFF** the Colorama effect using that **FX** button, to select such color directly from the original layer (using the color picker). **IMPORTANT NOTE:** no changes will happen unless you set the “Matching Mode” dropdown to anything **OTHER** than **OFF**; this dropdown will be discussed later.

**14.** And then you can define the tolerance of that color, i.e the color range that will be affected by Colorama, and also the resulting isolated area's "feathering", using the "Matching Tolerance" and "Matching Softness" controls. The higher "Matching Tolerance" value, the more Colorama will affect other colors as well; if you set this to zero value, Col-

**15.** Finally, there's the "Matching Mode" dropdown: you want to set it to "RGB" if the original layer imagery has high contrasts; but if it's more normal photo-

**16.** Now, instead of isolating using the original layer's colors, you can isolate using another layer's luminance value, or, alpha value. Go to the "Mask Layer"

**17.** Using the "Masking Mode" dropdown, you can decide whether to use that layer's luminance value or alpha value as the agent for isolating the Colorama effect. The higher the intensity of the luminance/alpha value, the intensity of

**18.** After you have isolated the Colorama effect, either based on Color or other layer's Luminance/Alpha value (or even both methods at once), you can decide whether the original layer's imagery appears on those non-Colorama-affected

orama will only affect the pixels that contain EXACTLY such color. The same principle also applies to the "Matching Softness" control. PLEASE NOTE THAT THE AFFECTED AREA is not necessarily CONTIGUOUS/ADJACENT, in fact Colorama will affect WHEREVER there is such a color.

graphic imagery, choose "Chroma." Selecting OFF will disable color isolation, essentially nullifying all the controls under the "Pixel Selection" group.

dropdown under the "Masking" group, to select such layer. And as usual, this layer shall be resized to fit the original layer.

the Colorama effect also increases, but you can choose any of the "inverted" options there too. Honestly for me, it's a lot easier to use the "Alpha" because it is straightforward.

area. Using the checkbox "Composite Over Layer", if you turn it ON, the original layer will appear on those areas, but if you turn it OFF, the areas not affected by Colorama will appear as Alpha/full-transparent areas.

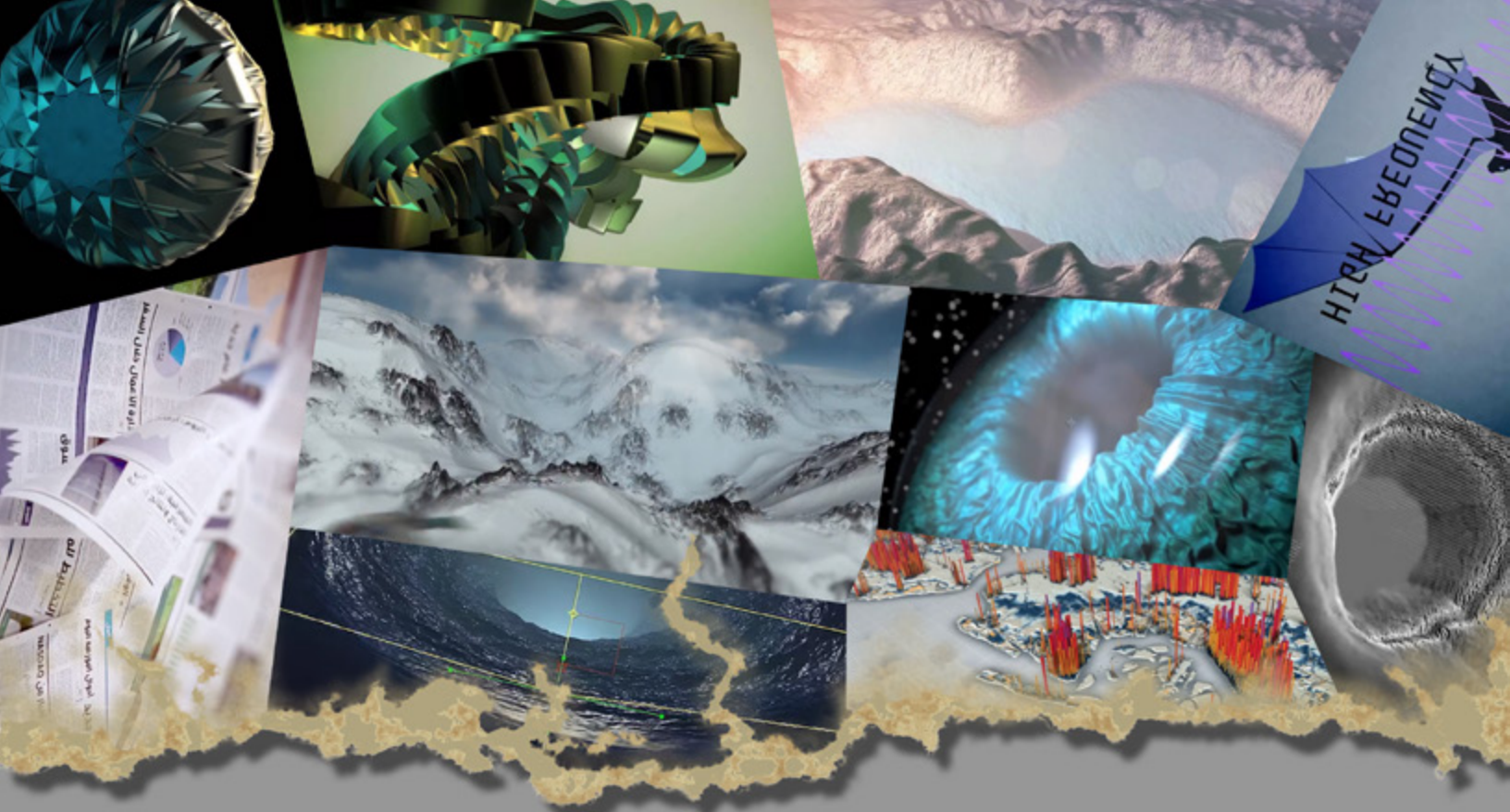


**19.** “Blend With Original”: this is similar as in other effects, i.e higher value reveals more and more the original, virgin, unaltered appearance of the layer, while fading more and more the result of the

Colorama effect. A value of a hundred percent is similar to turning off the Colorama effect altogether using the FX button.

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# Book 2: SHAPESHIFTER AE







# PART 1:

## INTRODUCTION

In this Part, we will introduce you to ShapeShifter AE. We will explore what capabilities this plug-in has, and the general mechanism of how it works. To boost your enthusiasm learning this powerful 3D plug-in, we will present you with a gallery of artworks done using ShapeShifter AE. And once you're inspired to learn, just go over to the Tutorials section so you can create those amazing artworks yourself! Without further ado, let's go ahead!

# CHAPTER 1:

## What is ShapeShifter AE

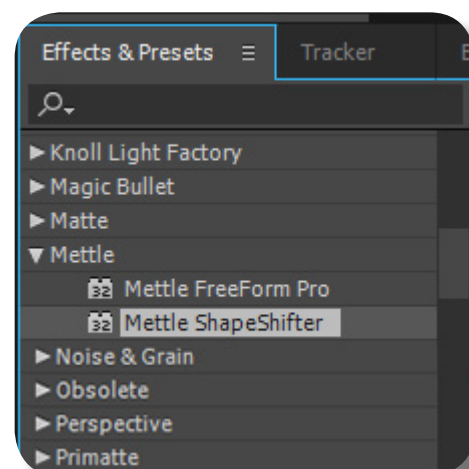


Welcome to ShapeShifter AE! With this powerful 3D plug-in, you can create true 3D assets entirely within After Effects, eliminating some of the needs to use external 3D programs. In this Chapter, we will explore the capabilities

of ShapeShifter AE and the general mechanism of how it works. We will also cover the most common uses for this plug-in in the VFX and motion graphics industry. After you're acquainted with ShapeShifter AE, please head over to Chapter 2 where we will give you a gallery of artworks, and list of tutorials where you can learn creating various ShapeShifter artworks from online video tutorials. If you decide you want to get technical learning, to know all the controls and mechanisms of this plug-in, please jump to Part 2 of this book.

### WHERE YOU CAN FIND SHAPESHIFTER AE

ShapeShifter AE is a plug-in that comes as an Effect. Using the “Effects and Presets” panel, you can find ShapeShifter AE under the “Mettle” category there (simply type “ShapeShifter” in the search box of that panel). You can also find it from the menu Effect -> Mettle -> Mettle ShapeShifter. If you can't find this plug-in anywhere despite having installed it correctly, there is a good chance it is caused by your After Effects installation folder not being in the original place that Adobe sets it to (C:\Program Files\Adobe), so you might want to re-install both After Effects and ShapeShifter AE to that default path.



## WHAT KIND OF 3D OBJECT SHAPESHIFTER CREATES



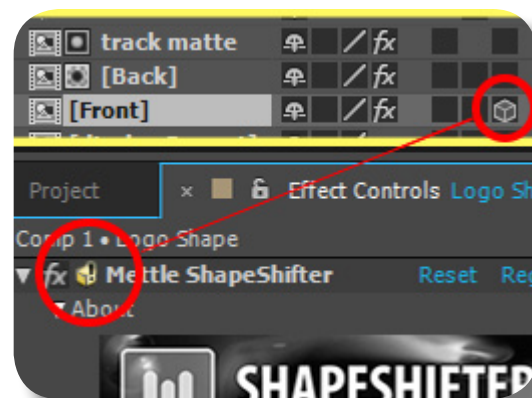
In its most fundamental function, ShapeShifter AE creates a full volume 3D object by extruding a flat 2D layer. As you can see from the picture here, the ShapeShifter object can be viewed around 360 degree as if it has actual solidness/thickness to it. This is in contrast to the object created using its sister plug-in, FreeForm Pro, which creates a 3D surface; so when you view it from the back area, it doesn't have full volume. But please note that the extrusion is symmetrical on the front & back sides.

## INTERACTING WITH AE LIGHTS AND CAMERA

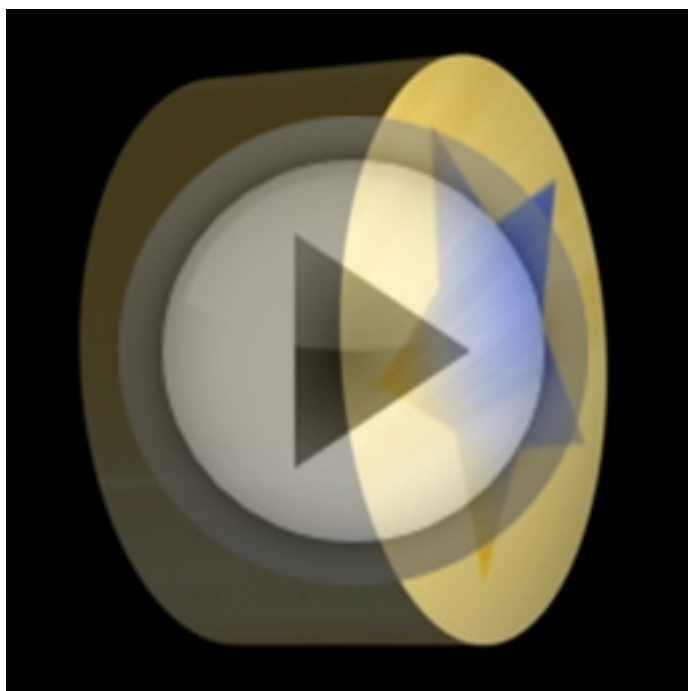
The resulting 3D object from ShapeShifter AE can interact normally with Light objects in your AE Composition. It can cast shadows, have reflections and specular highlights, and other attributes related to lights. Although admittedly, just like other 3D-creation plug-ins for AE, it does not interact normally with other 3D layers in the same Composition; for

example, it can not cast shadows to other 3D layers (only casts shadows on its own Mesh), and it can't have a normal "overlapping view" with other 3D layers when you rotate the camera around. In a later Chapter we will introduce you to some tricks so you can have the 3D object casting realistic shadows on another object.

The 3D object can also interact normally with AE Camera, which you can use to view around the 3D object. But please note that in AE terms, the layer that you applied ShapeShifter to must be a 2D layer; this is always the case with 3D Effects in AE, not just ShapeShifter AE. That is, you should not turn ON its 3D switch, otherwise a warning icon will appear, and the 3D appearance will be broken.



## HOW SHAPESHIFTER AE CREATES 3D OBJECT



ShapeShifter AE can create 3D objects from various 2D layers in After Effects, whether they be simple bitmap-image layers, vector layers, Shape layers, Solid layers, footage/movie layers, Precomp layers, and even native AE text layers. There are two basic ways that ShapeShifter creates 3D objects from these layers. The first one is a simple extrusion; so these 2D layers are flatly extruded (thickened) on the front & back areas, similar to how the “Raytraced 3D” feature in After Effects extrudes Texts and Shape layers; the appearance is of course a thick 3D object having a flat surface. Jump [here](#) to learn the controls specific to this simple extrusion.

The second method, allows you to not only have the “thickness” on the layer, but also protrusions and undulations on the surface, so it’s no longer flat. This method uses Displacement Map image to create the protrusions. Displacement Map is a layer that contains (usually) black-white/grayscale image that defines the protrusions. You can create this

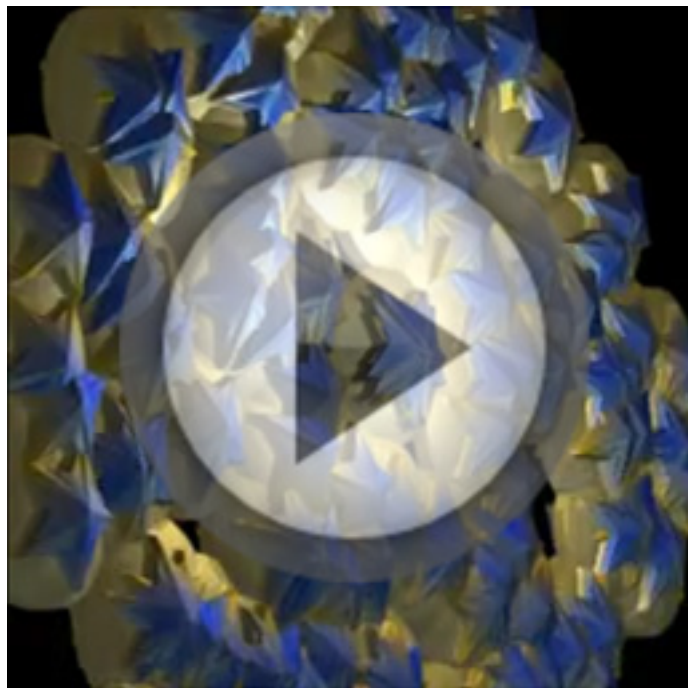
Displacement Map image yourself by various means. But remember, both methods create symmetrical thickness & protrusions on the front & back areas of the layer, that is, the front area has the same protrusions & extrusion (thickness) as the back area. Jump [here](#) to learn about the controls specific to Displacement Mapping.



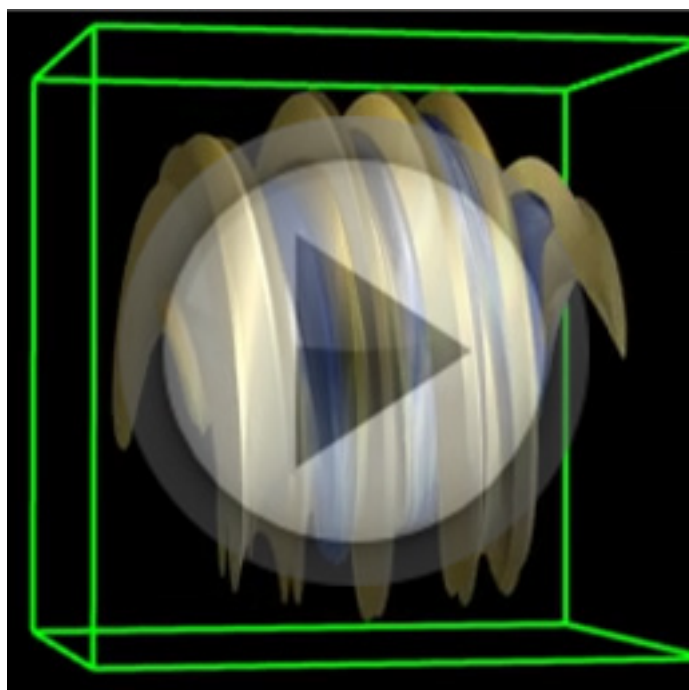


## CREATING AND MANIPULATING A SWARM OF 3D OBJECTS

In addition to creating a single solid 3D object, ShapeShifter AE also has the ability to create a swarm of 3D objects that you can then manipulate as a whole. So, after you have created your 3D object, you can then duplicate it numerous times using the “Generator” feature, and then rotate, move, or scale them as a swarm. This is perfect for creating abstract motion graphics animation, or, in rare cases, to create a complex non-symmetrical 3D object. Jump [here](#) to learn specifically about the “Generator” feature.



## TWISTING, BENDING, AND BULGING THE WORLD



After you have applied 3D deformations on your layer to create the full-solid 3D object, you can then further deform it using the “World Space Deformations” feature. With it, you can apply twisting, bending, and bulging deformations to your 3D object as a whole. This is perfect for spicing up your motion graphics animation, or, to create certain 3D shapes that would otherwise be impossible to achieve using mere extrusions & protrusions. You can learn about the “World Space Deformations” feature [here](#).



## CREATING THE SKY, FOG, AND MIST

Aside from creating 3D objects, ShapeShifter also has the ability to simulate the appearance of atmospheric distortion, mist, and even the sky that encompasses your Composition as a whole. These are actually the realm of its sister plug-in, FreeForm Pro when creating 3D terrains and land contour, but with creativity and skill, these features allow you to further spice up your motion graphics artwork in ShapeShifter AE. Jump [here](#) to learn specifically about these “Environment” features.

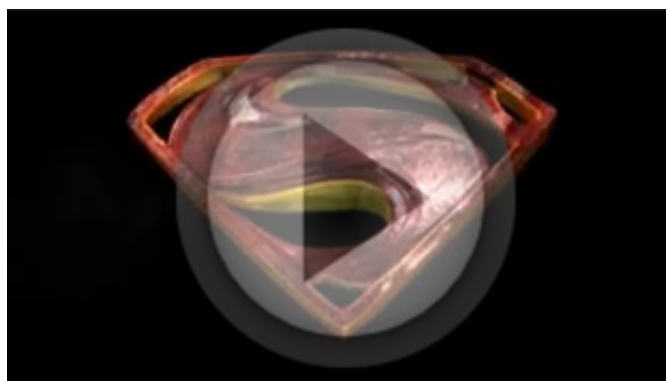


## COMMON USES FOR SHAPESHIFTER AE

ShapeShifter AE is a powerful plug-in that lets you create various 3D things entirely within After Effects, really your skill and imagination are the only limit. But there are certain projects that ShapeShifter AE is best

known for. Now that you have understood the many capabilities and mechanism of this plug-in, let's see what the artists are usually creating with it.

- 01.** Creating 3D logos for companies or brands. This is really the most common use for this plug-in. The real ease with which ShapeShifter allows 3D logo creation makes it stand out from the rest of 3D creation plug-ins out there. Simply slap ShapeShifter effect to your 2D layer, and crank the “Thickness” control and voila! You already have a fully-3D logo shape in under 5 seconds, complete with the reflections, specular, and the shadows!



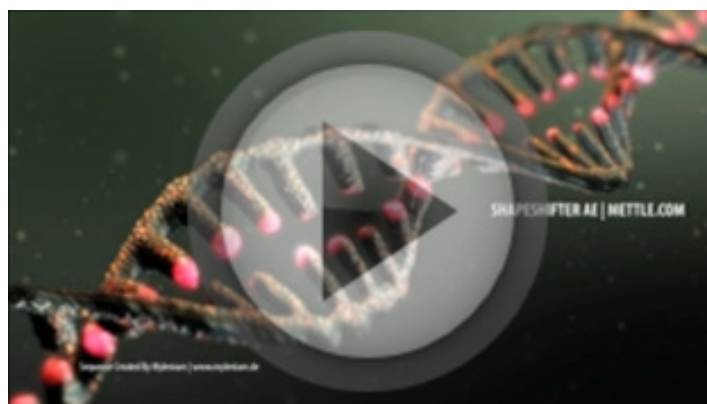
**02.** Creating 3D texts that accompany logos, or for movie opening titles. This is pretty obvious, if ShapeShifter AE can create 3D objects from complex logo shapes, then of course it can create 3D texts too! Simply type a text inside After Effects, and apply ShapeShifter to that text layer, and you already have a 3D text. Of course you can spice things up further to make the text more dynamic & beautiful.



**03.** Creating abstract 3D motion graphics. ShapeShifter is a perfect 3D plug-in for creating abstract motion graphics entirely within After Effects. Usually, these kinds of work are done using dedicated 3D programs, and then composited in After Effects. But with ShapeShifter AE, you can achieve the same result with unimaginable ease and in quicker time! You don't even need to leave the comfort of working in After Effects environment.



**04.** Creating specific 3D objects & shapes. This is a rare use for ShapeShifter AE, but with enough creativity and skill you can create various full 360 3D objects, either simple or complex, for a variety of purposes. If you're comfortable enough, you don't even need a slightest help from dedicated 3D programs to create 3D objects for your scene in After Effects.



# CHAPTER 2:

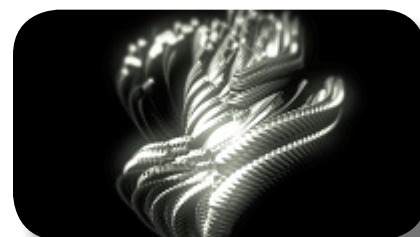
## Gallery and Tutorials

In this Chapter, you will be presented with a gallery of beautiful artworks done by talented artists using ShapeShifter AE. You can click on the video link to stream it online. Once you're inspired, head over to the

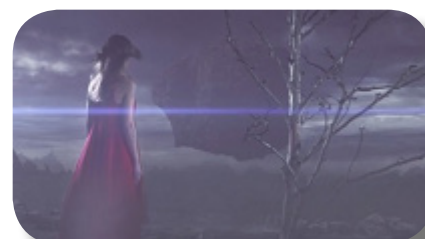
Tutorials section so you can begin learning ShapeShifter AE from noob to pro. Or, if you wish to learn ShapeShifter AE methodically & completely in all its controls, jump to Part 2 [here](#).

### GALLERY OF ARTWORKS

**01.** “Chanel Logo”. Created entirely in After Effects and using only ShapeShifter AE, this is a perfect showcase of ShapeShifter’s ability to create a dynamic 3D logo. Created by the Mettle team. Go [here](#) to view the video.



**02.** “Something Stronger by Origine”. As often happens, the turn-around time and budget were limited for this production. What to do? The model and band were shot on Greenscreen. All terrain and sky created and animated in After Effects with ShapeShifter AE and FreeForm Pro. A big shout-out to Tim Harris for a job well done. Visit the video [here](#)



**03.** “Aquaman Title Sequence”. Aquaman animation, logo design and 3D modeling by Chris Bobotis of Mettle. Created entirely in After Effects with mettle plug-ins. Chris is a big comic book art fan. That’s one of the reasons that he decided to study art, illustration and design in the first place. This updated version of the Aquaman logo draws from those lifelong passions. Rumour has it that Aquaman will make an appearance in the next Batman vs. Superman movie. (with Jason Momoa of Game of Thrones as Aquaman!). This sequence was created entirely in After Effects using Mettle’s FreeForm Pro and ShapeShifter AE. Visit the video [here](#)



**04.** “DNA Strand”. Impressive sequence created in After Effects by Mylenium (mylenium.de) using mettle ShapeShifter AE plugin. Particular was used for the background particles. A beautiful artwork that showcases ShapeShifter’s ability to create complex 3D objects. Visit the video [here](#)



**05.** “Praschan Requiem Title Sequence”. An After Effects film title sequence for Praschan Requiem, by Sonia Rechaux. Sonia used mettle’s 3D plug-in ShapeShifter AE for all the animated 3D shapes that wind in and out of the sequence. Send Sonia some love. Visit the video [here](#)



**06.** “Aethera Protoplasm”. A stylized visualization of life growing in the aether, with different shapes colliding, merging and new shapes growing. There’s some remarkable 3D shape-morphing, with very organic and fluid movement, all created and rendered in After Effects. We used ShapeShifter Ae and FreeForm Pro for the background and all the shapes. Snappy rendering with an NVIDIA Quadro K5000 GPU equipped workstation. Trivia tidbit: The word “protoplasm” comes from the Greek protos for first, and plasma for thing formed. Images and soundscape by Chris Bobotis (mettle). Visit the video [here](#)





**07.** “Space Morph Logo Animation”. Organic morphing logo animation - from simple orb to mettle icon. Created entirely in After Effects with mettle ShapeShifter Version 1.75. This teaser showcases some of the latest features: Spherical Displacement, a new 3D Displacement Mapping Mode; Xray render Mode; SkyDome feature we introduce into the Environment section. We also use Mettle’s SkyBox Studio + Trapcode Particular to generate the outer space background. Visit the video [here](#)



**08.** “denial.of.service Abstract Motion Graphics”. Created entirely in After Effects, using only ShapeShifter AE. Companion piece to [vimeo.com/96436831](https://vimeo.com/96436831). This video gives some insight into how Harry Martis (denial.of.service) creates his visuals in After Effects. He creates long segments, almost like a creative stream of consciousness. He then takes sections and further evolves them, to put into his final edit. Harry is known for his break-through work for clients, including David Bowie ([vimeo.com/79764317](https://vimeo.com/79764317)) and Banks ([vimeo.com/89140269](https://vimeo.com/89140269)). Visit the video [here](#)



**09.** “Amazing Spider-man Title Sequence”. This beautiful Spiderman title sequence by Nancy Eperjesy is created entirely in After Effects with the ShapeShifter AE plug-in. She creatively utilizes Shape Layers and Layer Masks to model and animate the Spiderman symbol and logo. You’ll be amazed how quickly ShapeShifter allows you to create such complex & beautiful artwork! Visit the video [here](#)



**10.** “The Expendables Title Sequence”. Awesome After Effects title sequence by Mettle. This piece shows a creative use of Displacement Mapping and Generator to create the 3D objects. Visit the video [here](#)





- 11.** “Superman Maltaannon Logo”. This impressive 3D morphing Superman Logo is a re-imagining of a classic logo entirely in After Effects using ShapeShifter AE. The 3D model was created using the variable feather masking feature in AE CS6 + the 3D shape morph was done using 2D filters that ship with After Effects. This logo was designed by Chris at mettle. The 3D morph was created by Maltaannon. Visit the video [here](#)



## SHAPESHIFTER AE TUTORIALS NOOB TO PRO

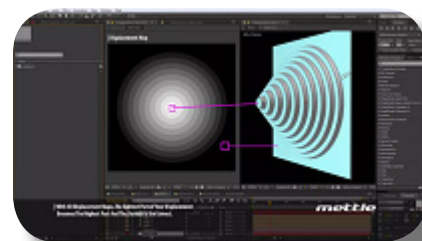
Are you inspired enough by the artworks? Of course you are! Know that you can create those beautiful pieces too, all by yourself, with the help of ShapeShifter AE. Now get off the couch and begin the journey of learn-

ing this powerful 3D plug-in. Whether you're a complete noob or a seasoned ShapeShifter user, this list of tutorials will skyrocket your 3D skills in After Effects!

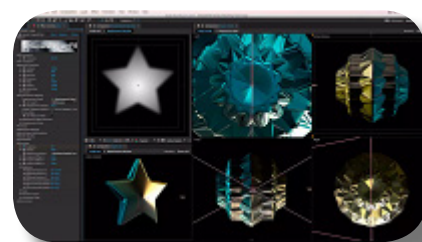
- 01.** “ShapeShifter AE The Ultimate Guide”. Chris Lavelle walks us through the features of ShapeShifter AE. He explains the general features, step-by-step. A good video manual that can be used as a general introduction to ShapeShifter AE. Chris Lavelle is an award-winning designer who works full time as lead graphic designer for Durham University, CEM. He's also a successful freelancer working under the guise of Ldistudios. His company creates logos, stings, VFX, websites etc. And if that's not enough, he is also a guest lecturer at Sunderland University, where he's a power user teaching After Effects in motion design, and Maya 3D. Visit the tutorial [here](#) (Vimeo) or [here](#) (Youtube).



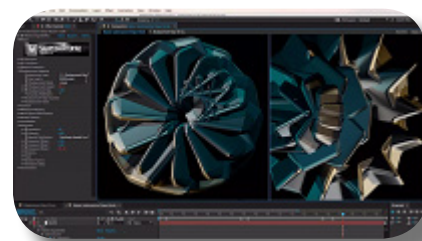
**02.** “ShapeShifter AE The Basics”. Ben Griggs ([www.iclickstuff.com/blog/](http://www.iclickstuff.com/blog/)) covers the basics of using ShapeShifter AE in this two parts tutorial. In Part 1, he uses Adobe text animation presets and looks at some of the file types that work well with ShapeShifter AE. In Part 2, Ben continues with the basics. He discusses Displacement mapping, and the importance of working in 16 bit per channel, in order to create many levels of grey, which are used to build the geometry in ShapeShifter AE. Visit the tutorial here: [Part 1](#), and [Part 2](#).



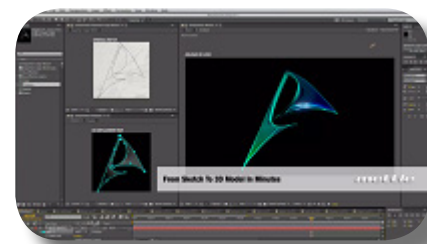
**03.** “3D Shape-Morphing in After Effects”. Learn how to create a 3D shape morph animation using the shape tools in After Effects and ShapeShifter AE. Nancy Eperjesy (partner at [mettle.com](http://mettle.com)) builds a simple animation with the shape tool and layer masks. She uses that simple animation as a Displacement Map with ShapeShifter AE to create an awesome 3D animation, in a fraction of the time it would take in a dedicated 3D app. Totally customizable technique. Visit the tutorial [here](#)



**04.** “Audio Reactive Shape Morphing Tutorial”. Nancy Eperjesy ([mettle.com](http://mettle.com)) shows us how to use [mettle](http://mettle.com) ShapeShifter AE and Trapcode Soundkeys to generate an Audioreactive animation in After Effects. ShapeShifter Ae allows you to create 3D objects directly in After Effects from After Effects shapes and layer masks. So this complex-looking animation is actually quite simple to put together using ShapeShifter features combined with basic tools in Ae. The animation uses a Displacement Map which allows for a completely customizable technique. Nancy uses these easy techniques with impressive results! She also shows how to add custom audio sync, modify the displacement map, and details that can make a difference, like animating the reflection map, and adding an overall X rotation to tie all the movements together. Visit the tutorial [here](#)



- 05.** “Model a 3D Aquaman Logo”. Design and model a complex, organic 3D logo in After Effects in minutes using Mettle’s ShapeShifter Ae and familiar 2D filters and techniques. Chris Bobotis designed the Aquaman logo, and shows us exactly how to recreate it. He uses clever techniques that save time and give great results. Chris is not only the developer of ShapeShifter - he’s also a designer and partner at mettle. Visit the tutorial [here](#)



- 06.** “Expandables Title Sequence Tutorial”. Nancy Eperjesy (mettle.com) explains how to create this parody title sequence. She uses Displacement Mapping and the Generator features of the ShapeShifter AE plug-in for all the replication. Visit the tutorial [here](#). Download the Project File [here](#)



- 07.** “Create the Amazing Spiderman Title Sequence”. You loved the Amazing Spider-man title sequence. So here’s the tutorial that shows you exactly how to recreate it in After Effects with our ShapeShifter AE plug-in. Nancy from mettle hosts this fun tut. You also get the free project file to boot! Download a free demo of ShapeShifter AE and follow along. Visit the tutorial [here](#). Download the Project File [here](#).



- 08.** “Captain America Shield & Text”. This After Effects sequence is created with mettle’s 3D plug-ins FreeForm Pro and ShapeShifter AE. The background rock is created using the Displacement Mapping feature of FreeForm Pro. The Captain America 3D text is created with ShapeShifter AE. The shield with FreeForm Pro. Finishing touches are added with RGS, Magic Bullet + Trapcode Suite Products. Watch the tutorial [here](#). Download the Project File [here](#)



**09.** “3D Pixelstorm Tutorials”. This three parts tutorial gives you a good insight on how to create an abstract 3D Motion Graphics piece in After Effects using ShapeShifter AE. In Part 1, Nancy will show you how to create 3d shape morphs and leverage tools and animation presets that ship with After Effects. She covers some of the powerful features in ShapeShifter AE and even touches on pre-comping. In Part 2, Nancy explores ShapeShifter AE’s built-in Generator. Some have called it a mini, built-in, Mo Graph (a la C4D) others a bit of a particle system... we call it cool :) Check it out. In Part 3, Nancy covers deformations and applies the finishing touches. Watch the tutorials here: [Part 1](#), [Part 2](#), and [Part 3](#).



**10.** “Create Superman Logo in After Effects”. This five parts tutorial gives you an indepth insight into creating a cool 3D logo using ShapeShifter AE. In Part 1, Trevor Coates explains how he started the design of the logo, and show us his initial renders. He uses Mettle’s ShapeShifter AE to build his model in After Effects. Nancy (mettle.com) introduces the series. In Part 2, Trevor shows us how he sculpted the 3D logo design using ShapeShifter AE + variable feather masks. He also uses 2D filters that ship with After Effects to create animated texture (color) and displacement maps. In Part 3, Trevor shows us how he created the 3D logo design using ShapeShifter AE + 2D filters, transitions etc. to create animated texture (color) and displacement maps. In Part 4, Trevor shows us how he created the 3D logo design using ShapeShifter AE. Trevor covers compositing, grading, show us some neat tricks and adds some finishing touches to this sequence. In Part 5, a bonus tutorial, Trevor shows us how he adds shadows to After Effects layers. Watch the tutorials here: [Part 1](#), [Part 2](#), [Part 3](#), [Part 4](#), [Part 5](#).





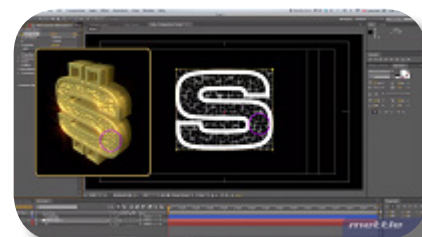
- 11.** “Bevels & Styles Tutorial”. VinhSon Nguyen from [creativadojo.net](http://creativadojo.net) uses After Effects Shape Layers, Masks + 2D filters to create some neat animated bevels and styles for ShapeShifter AE. He explores the free project file that is available for download. Enjoy and send VinhSon some love :-). Visit the tutorial [here](#). Download the Project File [here](#)



- 12.** “Crystal 3D Logo by Tim Harris”. Tim Harris created this logo sequence with a crystal finish for his company in After Effects. Tim used ShapeShifter AE and several other plug-ins to pull this off. Watch Tim break this down, then send Tim some love. Visit the tutorial [here](#)



- 13.** “Make Big Buck\$, in Minutes”. Learn how to use ShapeShifter AE, in this quick and easy tutorial. Nancy Eperjesy ([mettle.com](http://mettle.com)) explains the concepts of Reflection Mapping and Displacement Mapping. Visit the tutorial [here](#)



- 14.** “Superman in Manhattan”. Jerzy Drozda Jr ([malta-annon.com](http://malta-annon.com)) shows us how to do 3D camera tracking on a real motion graphics example, 3D alpha mattes, and creates 3D shapes and graphics right inside After Effects. Watch the tutorial [here](#)

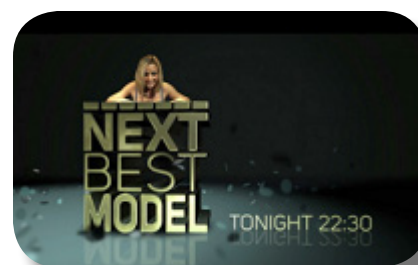


- 15.** “Compositing ShapeShifter Ae and Particular”. Brad Magnus walks you through compositing a scene using ShapeShifter and Particular. It’s easy to get the appearance of a unified 3D space with ShapeShifter’s Depth render setting. Visit the tutorial [here](#)





- 16.** “Reality Show Teaser by Eran Stern”. Eran Stern (sternfx.com) shows how to create a teaser for an upcoming reality show using footage from artbeats.com and plug-ins from Mettle, GenArts and Red Giant. Watch the tutorial [here](#)



- 17.** “BattleShip Parody Tutorial”. This is a good tutorial to show you how to create a complex 3D object using ShapeShifter AE. In Part 1, Ran Ben Avraham uses ShapeShifter AE, Trapcode Form + VCP Optical Flares. He also touches on Mamoworld’s iExpressions. In Part 2, Mathias Mohl (mamoworld.com) uses iExpressions to create realistic movement in After Effects. He rigs a 3D character using iExpressions on the Generator, a feature-set found in ShapeShifter AE. Watch the tutorial here: [Part 1](#), and [Part 2](#).





## PART 2:

### DISSECTING ALL CONTROLS

In this Part 2, we will discuss all ShapeShifter's controls thoroughly. This part is perfect as a reference guide, or if you want to learn ShapeShifter AE in-and-out with all its mechanisms and quirks. Please note that quite a lot of ShapeShifter's controls share the same name and mechanism as the controls in FreeForm Pro, and if such similarity occurs we will direct you to the corresponding explanation in FreeForm Pro chapters. So let's get to the nuts and bolts!

# CHAPTER 3:

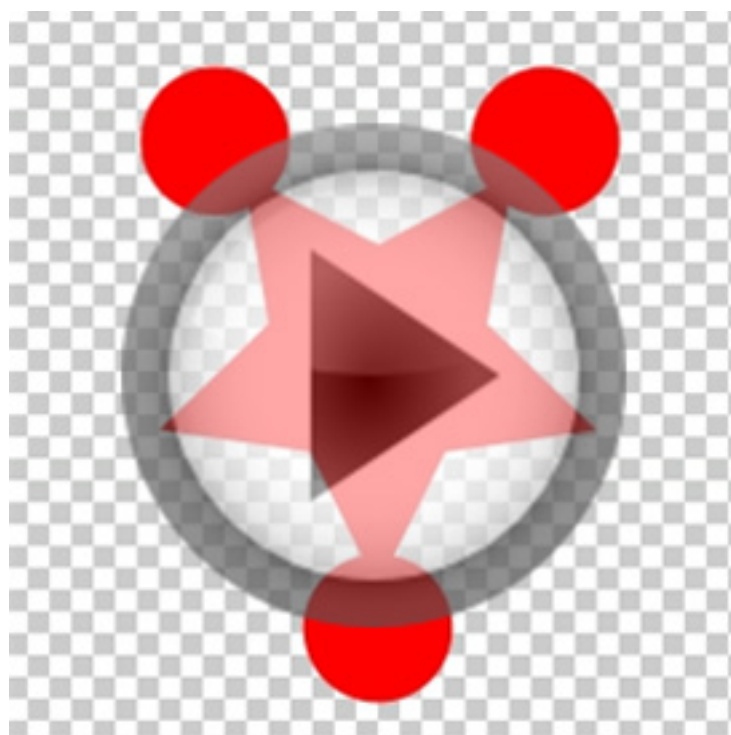
## The “3D Extrusion” Group



This group is used for creating a simple, flat extrusion on your layer. As already described in Chapter 1, when extruding your layer this way, the resulting 3D object has thickness or volume to it, but a completely flat surface on both the front and back sides. Look at the video here.



## GENERAL MECHANISM OF SSAE EXTRUSION



The layer that you applied Shape-Shifter to can be a bitmap image layer, a Solid layer, Shape Layer, native AE Text layer, a movie/footage layer, even a Composition layer that contains many image elements inside; all these 2D layers will then be extruded on its depth axis (i.e Z axis). The image appearance (texture) is the same on the front and back sides of the 3D object. In case there's Alpha/hole on the layer, the shape of the 3D object will conform to the original shape of the 2D layer due to Alpha. If there is semi transparency on the original layer, the protrusion & extrusion will be reduced on those transparent areas, and if the 3D object's thickness is minimal you can begin to see holes on those transparent areas. In case of

moving imagery data (footage or Composition layer) that has clearly defined shapes due to Alpha, the resulting 3D object will also conform its shape & appearance to the moving imagery, on the fly. NOTE: The extrusion surface (the surface of the extruded area) reacts normally to Lights, Shadows, and Reflection the same way as the front & back sides are.

## EXPLANATION OF THE CONTROLS HERE

- 01.** "Thickness" control: this sets the actual extrusion of your layer, thus the simple thickness of the 3D object, as already explained. No negative value here.
- 02.** "Flatten Edge" control: this flattens the extruded surface although very, very slightly, since one can't really see the extruded surface being bevelled anyway. (What's being beveled is the protrusion caused by the Displacement Map, i.e if you blurred the Displacement Map layer on the edge areas, not the extrusion surface caused by this "Thickness" control).

## EXTRUDING USING “THICKNESS” VS. “DISPLACEMENT MAP”



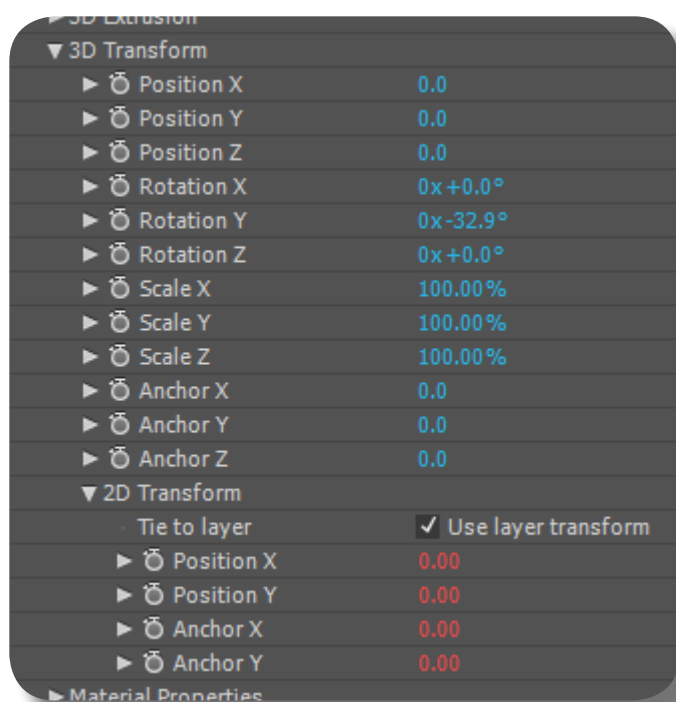
Sometimes there's confusion whether to use this group to control the extrusion, or to use the Displacement Mapping group (i.e if you don't set any Displacement Map layer, and just increase the "Displacement Height" control right away), because they seem to do the same thing; but upon closer inspection, the resulting 3D object due to Displacement Map extrusion is not as smooth & clean as using this "3D Extrusion" group, and there are some angled extrusions on it that seems like rough bevelling. In short, for the general/entire extrusion of the layer, you must use this group, and then for specific protrusions/undulations you can use the Displacement Mapping feature.



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# CHAPTER 4:

## The “3D Transform” Group

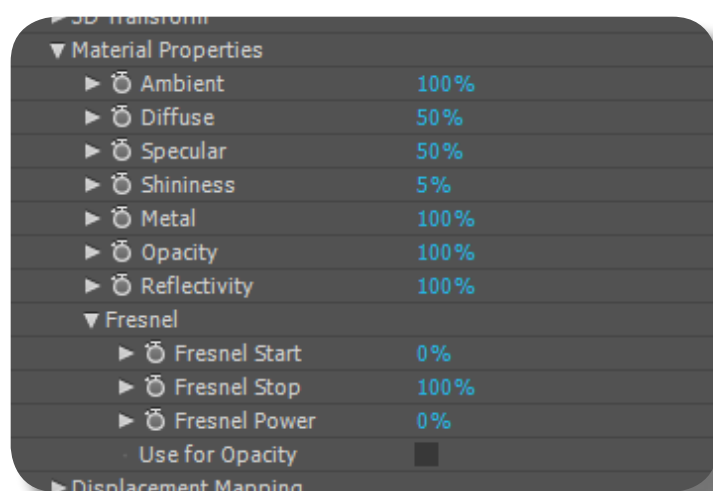


All controls and mechanism here are exactly the same as FreeForm Pro’s “3D Transform” group. The only exception, there is no graphical indicator of where the Anchor Point is (the small red box icon). Jump [here](#) to go to FreeForm Pro’s “3D Transform” Chapter.



# CHAPTER 5:

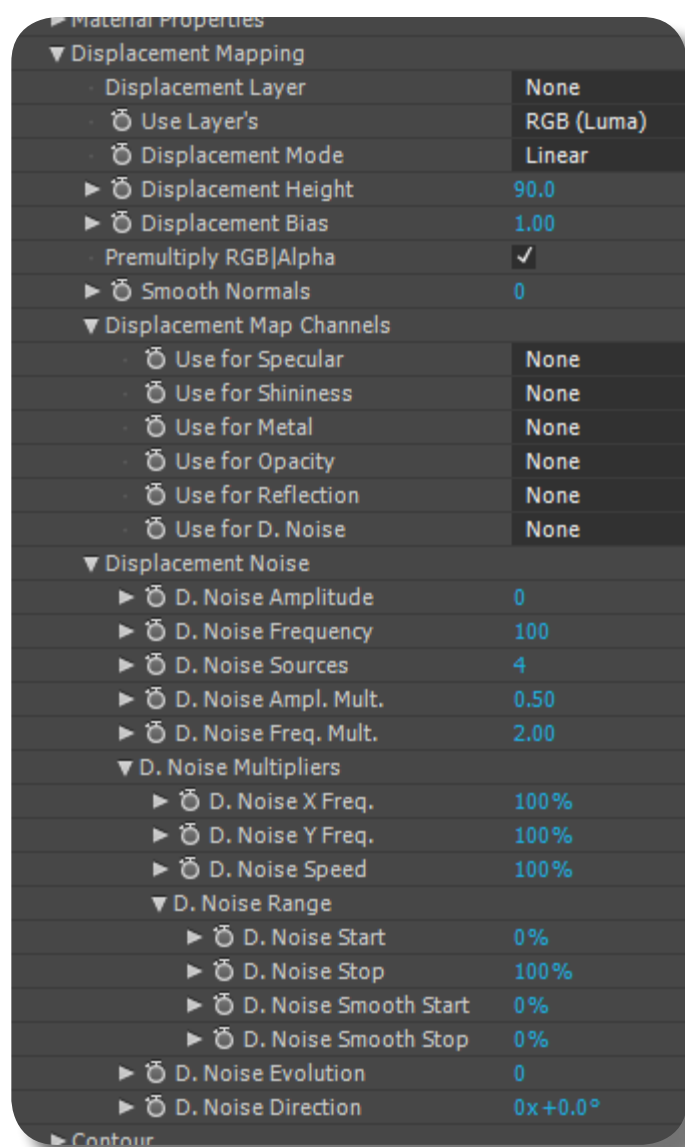
## The "Material Properties" Group



All controls and mechanism here are exactly the same as FreeForm Pro's "Material Properties" group. Jump [here](#) to go to FreeForm Pro's "Material Properties" Chapter.

# CHAPTER 6:

## The “Displacement Mapping” Group



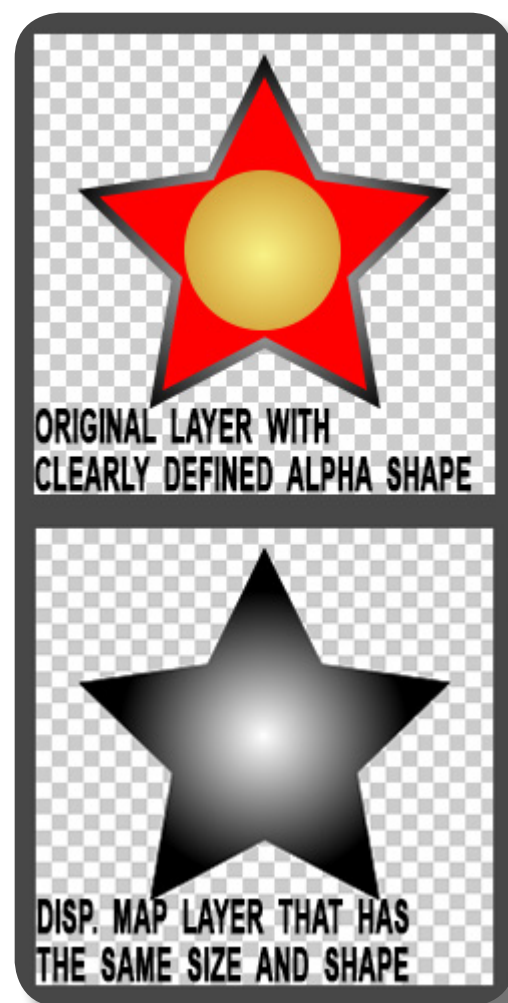
Almost all controls and mechanism here are the same as in FreeForm Pro’s “Displacement Mapping” group, although there are few stark differences that we will discuss in this chapter. Preferably, you want to read about the Displacement Mapping chapter in FreeForm Pro, and only then you read the chapter here to understand the differences. Jump [here](#) to read the complete & thorough explanation about Displacement Mapping in FreeForm Pro.

## UNIQUE MECHANISMS IN SHAPESHIFTER'S DISPLACEMENT MAPPING

Here we will discuss the mechanisms of ShapeShifter's Displacement Mapping that are different than FreeForm Pro's. Aside from these differences, everything is the same as in FreeForm Pro.

**01.** The single biggest difference between FreeForm Pro's Displacement Mapping and ShapeShifter AE's is that the protrusions happen on **BOTH** the front & back sides of the 3D object, symmetrically.

**02.** Since the nature of ShapeShifter AE is creating a 3D object that has creative outline/shape to it (instead of a 3D surface from a rectangular 2D layer), you might want to use as the Displacement Map a layer that has the same size (dimension) to your Mesh layer, preferably even a copy of the original layer that you manipulated to become a grayscale layer, thus not only having the same dimension but also conforming exactly to the shape/outline of the original layer.







**03.** Protrusions from a Displacement Map is applied on top of the general “Thickness” of the object from the “3D Ex-

**04.** Another big difference is that the resulting protrusions from Displacement Mapping are normally rough & not refined, even after you blurred the Displacement Map layer. To solve this, you can go to

**05.** The “Displacement Bias” control can be used primarily to influence the “Thickness” of the 3D object, so you can use it in tandem with the “Thickness” control from the “3D Extrusion” group. But most importantly, this can be used to create a sort of beveled extrusion especially if you have set the “Thickness” control to 0 but the 3D object still has flat extrusion surface after you use the

**06.** And then there’s the “Displacement Mode”, which is not present in FreeForm Pro. “Linear” is the standard Displacement Mapping mode similar to FreeForm Pro’s. “Spherical” eats the 3D object if the luminance value of an area of the Displacement Map layer is below 50% (below 0.5 if you use Decimal on the Info Panel), i.e the area below 50% on the Displacement Map will eat/remove the 3D object on that area (the same thing also applies to any of the R/G/B/A values, if you’re using those particular channels for Displacement Mapping). The Displacement Map data still create protrusions the normal way if they’re above 50% luminance value, and of course the more it is toward 100% value, the protrusions are higher & vice versa. Thus beware if you blur your Displacement Map layer, some area might

trusion” group. That is, the protrusions add FROM the thickness, not being subsumed/engulfed by the Thickness.

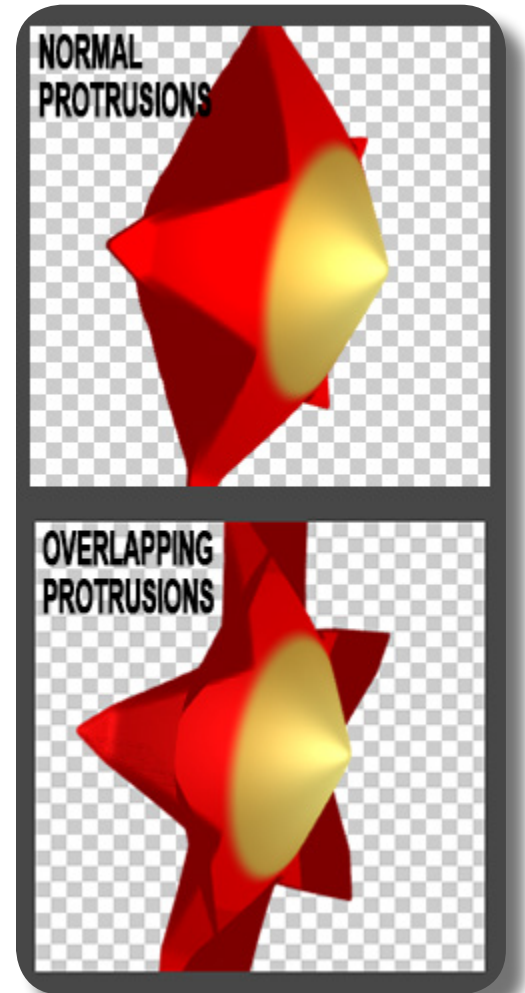
the “Tessellation” group and set “Tolerance” control to the lowest value; and do not forget to always turn ON the “Adaptive” checkbox otherwise the 3D object gets very whacky.

Displacement Map; to achieve this beveled look, simply reduce this “Bias” value and it will eat away the flat extrusion from the Displacement Map. But remember that sometimes setting this control to its minimum value will eliminate the 3D object’s Material properties, thus you won’t see any Specular or even Reflection on it, etc.

come below 50% luminance value. **IMPORTANT NOTE:** you can also reveal away those eaten area by REDUCING the “Alpha Threshold” control under the “Contour” group, although admittedly, even at 0% value on the “Alpha Threshold”, some areas too low in luminance can’t be revealed. Note on using the “Displacement Bias” control if you’re on “Spherical” method: **UNLIKE** in the “Linear” method where “Displacement Bias” merely reduces the distance between the front & back extrusions thus essentially reducing the “thickness” (if extreme enough, it will swap & overlap the front and back protrusions), in the “Spherical” method, it can shrink/expand the entire protrusions from the Displacement Map, thus some areas of the 3D object can be eaten or revealed too, not just swapped as in “Linear” method.



- 07.** Displacement Noise: because protrusions from the Displacement Map are created on both the front & back sides, you must give ample thickness to the 3D Object so the Displacement Noise doesn't swap & overlap between the front & back sides.



## SOME QUIRKS ON THE EXTRUSION SURFACE

In regard to the 3D object’s extrusion surface (the surface of the extrusion), there are two things that you must do to the Displacement Map layer if you want a normal-looking 3D object:

- 01.** Make sure the base color of the Displacement Map, i.e the lowest luminance value, is NOT PURE Black, especially not at the area that corresponds to the edge/outline of the 3D Object. If you use pure black, what will happen is that the extrusion surface (surface of the extruded area), either from “Thickness” control or from merely cranking the “Displacement Height”, will NOT REACT AT ALL to Lights, Shadows, and Reflection; only the front & back sides of the 3D object will react normally to Lights, Shadows, and Reflections. So the solution is to crank up the Displacement Map’s lowest luminance value JUST A TINY BIT above Pure Black, and the extrusion surface will behave normally again; at least do this on the edge area, since using pure black on the inside area is OK.



**02.** Make sure the edge area of the Displacement Map layer, i.e area that corresponds to the edge of the 3D object as already explained before, is blurred quite high. This is so that when you go to the "Contour" group and turn ON the "Use Texture Layer's Alpha" checkmark (for creating semi-transparent surface areas on the 3D object), the extrusion surface will not become transparent and making the appearance as if the 3D object is not solid at all. The higher the blur, the more opaque the extrusion surface will be. You can apply a Mask to contain the blurring effect only on the edge area, and the result will be the same. By default, if you turn ON that checkmark while you don't have Displacement Map set, the extrusion surface will become transparent; so, you must have a Displacement Map set, AND, blur it quite high on the edge. As a side note, if you turn ON the checkmark below it, "Use Displacement Layer's Alpha", the extrusion surface will always become transparent even if you use this technique.



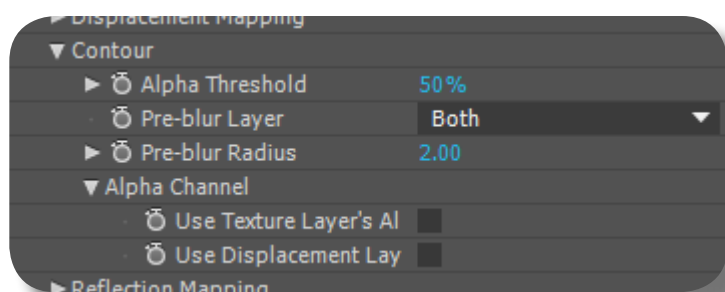
## THE NATURE OF PURE-BLACK COLOR ON A DISPLACEMENT MAP

Remember that the mechanism of Displacement Mapping is that the pure black area, no matter how high the "Displacement Height" value, is always flat while other more luminous areas (even just a tiny bit more lu-

minous) are having protrusions. If it's not pure black but just slightly more luminous, the protrusion growth is there but very very slowly while other more luminous areas are already protruded high.

# CHAPTER 7:

## The “Contour” Group

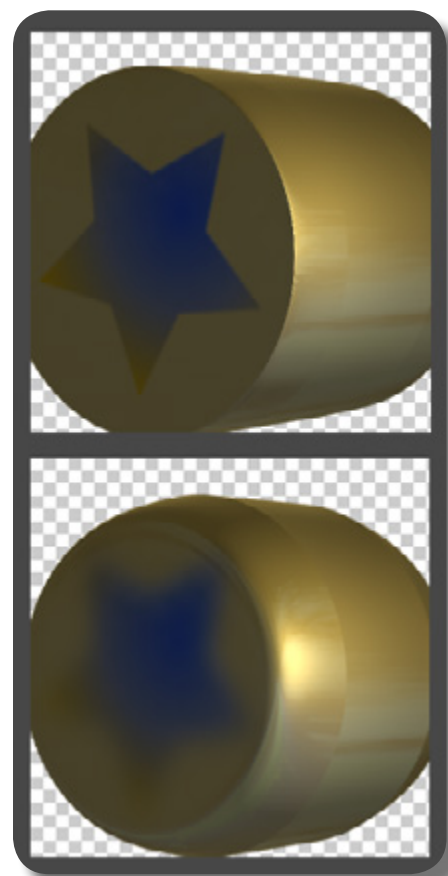


Almost all controls and mechanism here are the same as in FreeForm Pro’s “Contour” group, although there are few specific mechanisms unique to ShapeShifter AE. Preferably, you want to read about the “Contour” group Chapter in FreeForm Pro first, and only then you read the chapter here to understand the differences. Jump [here](#) to read the complete & thorough explanation about the “Contour” group in FreeForm Pro.

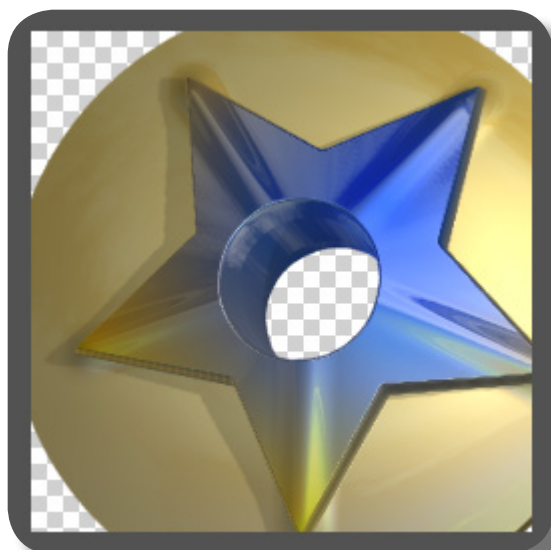


## ACHIEVING BEVELED LOOK USING PRE-BLUR LAYER & RADIUS

The "Pre-Blur Layer" and "Pre-Blur Radius" controls are generally similar in function as in FreeForm Pro. But in regard to ShapeShifter's Mesh, you can use these controls to blur the Texture Layer (especially if you crank the blur high), and the 3D object will be smoothed out & rounded on the edge/outline area, so it can help to achieve the beveled look, although of course it blurs the texture appearance. You can achieve the same thing if you blur the texture layer using a blurring effect, thus if you contain the blurring effect using Mask, you can achieve that rounded beveled look but still maintain the sharpness of the texture. Please note that beveling using this technique only works on the extrusion created by Displacement Map, NOT by the "Thickness" control (from "3D Extrusion" group).



## THE "ALPHA CHANNEL" SUB-GROUP

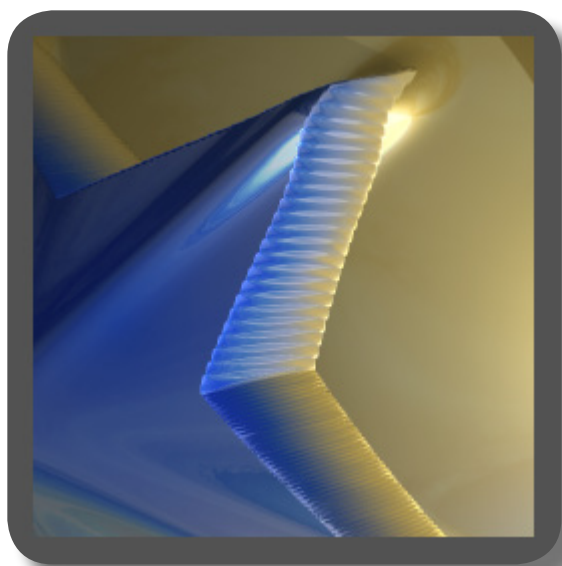


This sub group is generally the same as in FreeForm Pro, i.e. to show Alpha area (either semi-transparent or fully transparent) on the 3D Object's surface. So in regards to ShapeShifter's Mesh, you can see through that transparent area to the other side (or to the "inside") of the 3D object. Think of using this sub group as making the surface or "skin" of the 3D object to become transparent, not a perfect hole. If you want "perfect hole" (with extrusion surface a.k.a "walls" on the hole), of course you don't need to check any of the checkboxes here, just leave your alpha as is, but if the Alpha (from

either the texture layer or Disp Map layer) is not intense enough, the “perfect hole” will be small or nonexistent, so crank up the “Alpha Threshold” control to make it bigger. And there’s one important note about this sub group (actually applies to FreeForm Pro too!): if you wish to show transparent area on the 3D Object’s “skin”, but BOTH the

Displacement Map layer and the original/texture layer have transparent area, then checking ONLY the “Use Displacement Layer’s Alpha” checkbox will result in the 3D object having the transparent area of BOTH THESE two layers (although the unchecked one will have its transparency applied less intense).

## ELIMINATING THE “RIDGE-LINES” APPEARANCE ON THE EXTRUDED AREA

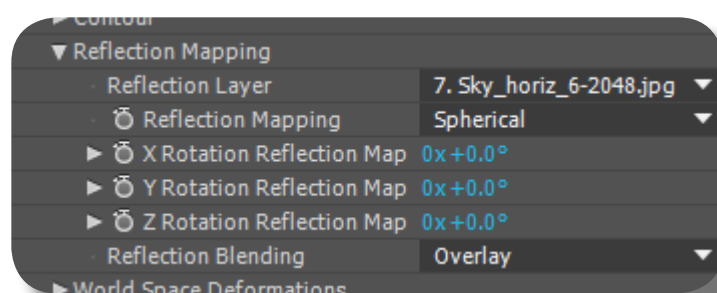


You can get rid of those “ridge-lines” appearance on the extruded area (the lines on the edge/side of the protrusion caused by Displacement Map) by blurring BOTH the original layer AND the Displacement Map layer, even a tiny bit. You can achieve this by simply using the Pre-blur controls from this “Contour” group, or, you can use your own blurring effect.

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# CHAPTER 8:

## The “Reflection Mapping” Group

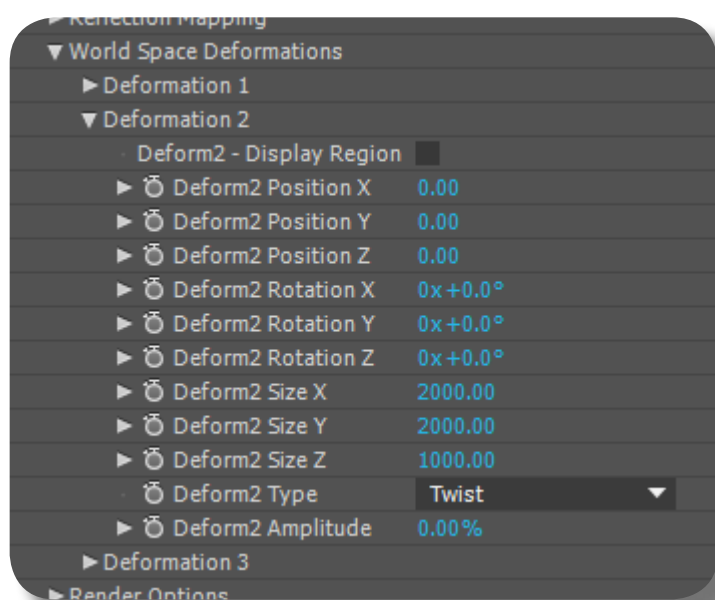


All controls and mechanism here are exactly the same as FreeForm Pro’s “Reflection Mapping” group. Jump [here](#) to go to FreeForm Pro’s “Reflection Mapping” Chapter.



# CHAPTER 9:

## The “World Space Deformations” Group

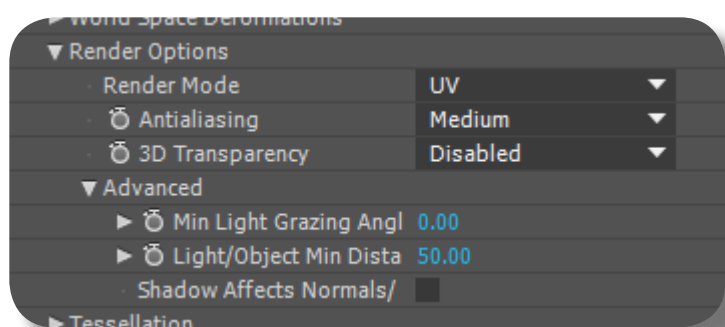


All controls and mechanism here are exactly the same as FreeForm Pro’s “World Space Deformations” group. Jump [here](#) to go to FreeForm Pro’s “World Space Deformations” Chapter.



# CHAPTER 10:

## The “Render Options” Group



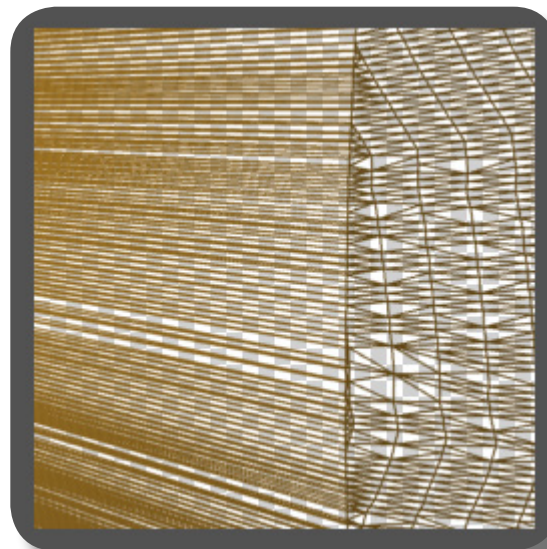
Almost all controls and mechanism here are the same as in FreeForm Pro’s “Render Options” group, although there are few specific differences unique to ShapeShifter AE. Preferably, you want to read about the “Render Options” group Chapter in FreeForm Pro first, and only then you read the chapter here to understand the differences. Jump [here](#) to read the complete & thorough explanation about the “Render Options” group in FreeForm Pro.

### THE RENDER MODES ON SHAPESHIFTER’S OBJECT

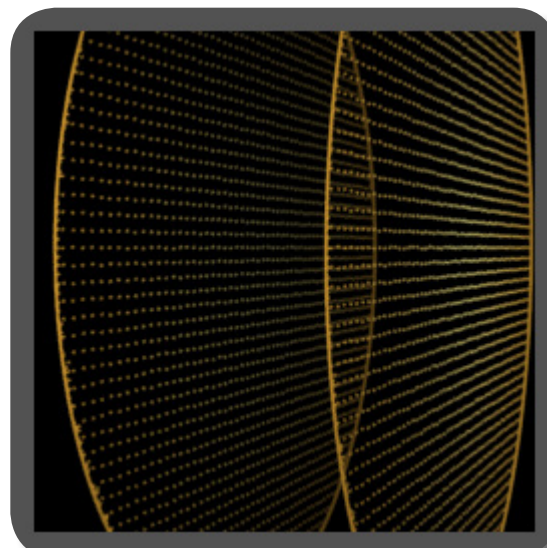
Options under the “Render Mode” control behave the same way as in FreeForm Pro, except when viewing the Extrusion Surface area if it’s caused by the “Thickness” con-

trol under the “3D Extrusion” group (NOT the extrusion caused by Displacement Map). The differences happen if you use these viewing modes:

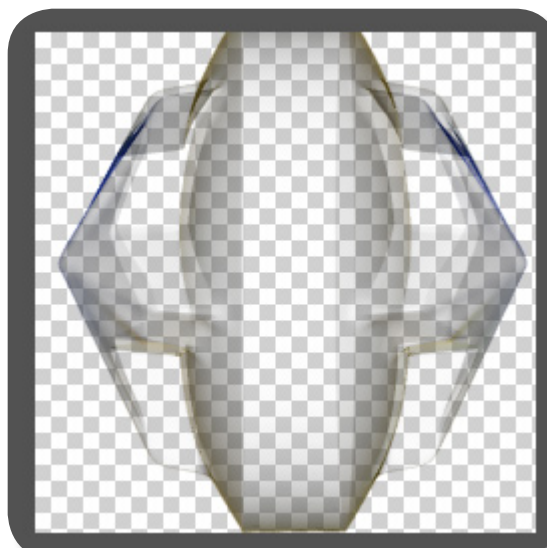
- 01.** Wireframe: If you zoom in closely, the wire mesh on the Extrusion Surface is not triangular wire mesh as in the Front & Back sides of the 3D object, the wires are just simply stretched into very long strands.



- 02.** Points: The points exist only on the Front & Back sides of the 3D object, not on the Extrusion Surface.



- 03.** X-Ray: Obviously the appearance here is different than in FreeForm Pro, because instead of a single surface, now we have two surfaces (the Front, and, the Back sides), and the Extrusion Surface area is completely transparent/nonexistent.





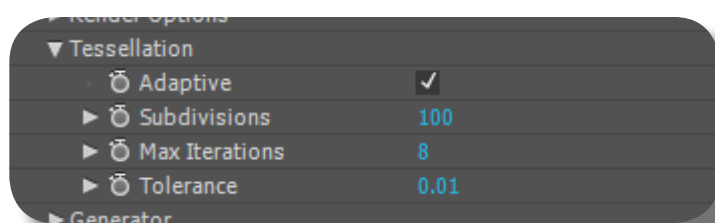
All these points are true even after you have lifted the luminance and blurred the Displacement Map layer to create a normal Extrusion Surface, as already explained sometime ago in the “Displacement Mapping” chapter.

Aside from these things already explained, **EVERYTHING** under this “Render Options” group behaves the same way as in FreeForm Pro.

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# CHAPTER 11:

## The “Tesselation” Group



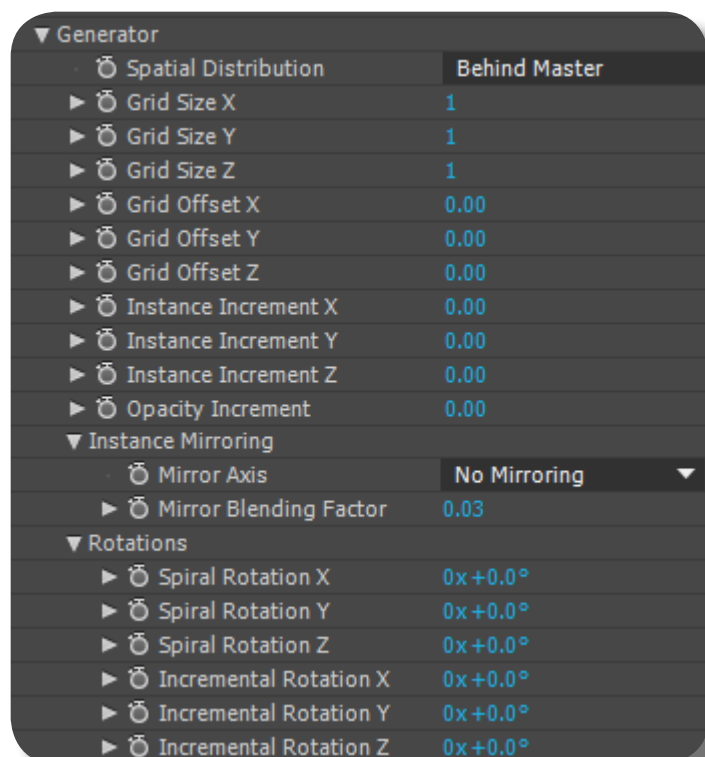
All controls and mechanism here are exactly the same as FreeForm Pro’s “Tesselation” group. Jump [here](#) to go to FreeForm Pro’s “Tesselation” Chapter. Please note, as already described sometime ago, you may want to crank down the “Tolerance” control in this group to its absolute minimum value, to create a smoother & cleaner 3D Object.





# CHAPTER 12:

## The "Generator" Group

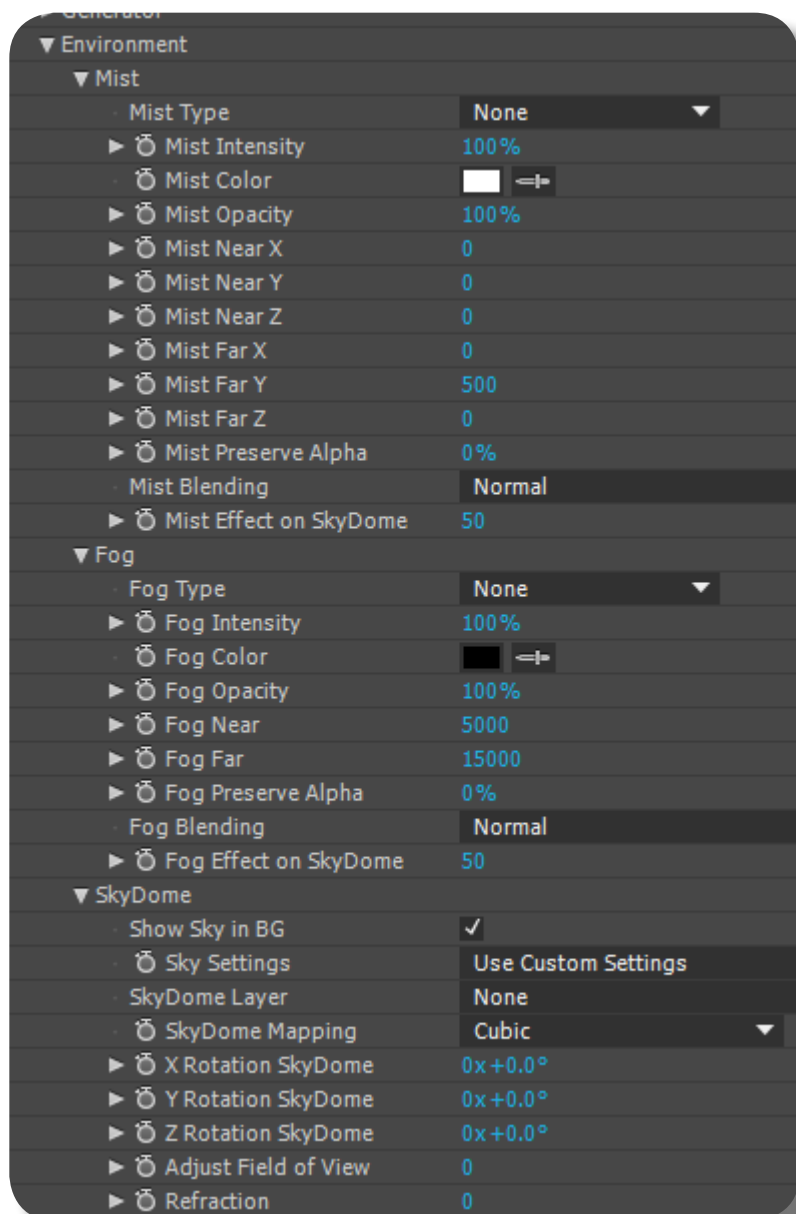


All controls and mechanism here are exactly the same as FreeForm Pro's "Generator" group. Jump [here](#) to go to FreeForm Pro's "Generator" Chapter. Please note you might want to really turn down the "Adaptive" and "Subdivisions" controls from the "Tessellation" group, and "Antialiasing" control from the "Render Options" group, because the workspace gets really slow once you create so many 3D objects using the Generator. Only when you are about to render the final output should you turn those controls back ON to their normal settings.

# CHAPTER 13:

## The “Environment” Group

All controls and mechanism here are exactly the same as FreeForm Pro’s “Environment” group. Jump [here](#) to go to FreeForm Pro’s “Environment” Chapter.





# PART 3:

## TIPS, TRICKS, AND NOTES

In this Part, we will discuss miscellaneous topics about ShapeShifter AE, along with some complementary techniques that will be useful when you're using this Plug-in, such as how to cast shadows on another 3D layer without using external plug-in. Let's go ahead!



# CHAPTER 14:

## Miscellaneous Notes

In this Chapter, we will discuss various topics related to your workflow in ShapeShifter AE. In one way or another, you

may find any of these topics useful, so please follow along!

### APPLYING MULTIPLE SHAPESHIFTERS ON THE SAME LAYER

You can not use multiple ShapeShifter AE on the same layer (or even FreeForm Pro!), to achieve a complex 3D object. The resulting 3D object, although good enough at first glance, once you start rotating and moving the camera or using the “3D Transform” group’s manipulations, will be so warped & abnormal (even causes nausea on some people) because the two effects use two different and separate 3D stage, not continuous as one. If you want to achieve such a complex looking 3D object, it’s best to

use two separate layers (or more!) and each applied with a SINGLE ShapeShifter AE (or FreeForm Pro); you will then have to devise ingenious tricks on how to “combine” these two 3D objects into a continuous 3D appearance. It’s beyond this book to discuss such tricks, but believe me, with enough patience on learning After Effects, you’ll discover those tricks, which can be mightily useful because it’s a lot easier & faster than actually modelling 3D object from a dedicated 3D program.

## THERE'S LIMIT ON HOW MANY LIGHTS YOU CAN CREATE FOR SSAE

When using ShapeShifter AE (applies to FreeForm Pro too!), there's a limit to the number of Lights you can create in the Composition. If this limit is exceeded, a warning dialogue will appear and then After Effects may crash if you don't reduce the number of Lights. More specifically, ShapeShifter doesn't like too many "Point" Lights: you can have a maximum of only 2 Point Lights, and not any more lights after that (including other types of light). Point Light uses the

most amount of "shadow source" slots, i.e. SIX "shadow source" slots per Point Light, especially if it's close to the 3D object. So instead of adding more Point Light, you better use Spotlight or Parallel light instead. Please note that sometimes this warning dialogue does not appear at all, and ShapeShifter AE or FreeForm Pro will still work normally even if you use 3 Point Lights or more (it's because they're positioned far from the 3D object).

## CONVERTING A COLOR IMAGE INTO GRAYSCALE/BLACK-WHITE

There are some ways that you can convert a color image into a Grayscale/BW image. One way is using the "Tint" effect, just make sure that the controls "Map Black To" and "Map White To" are set to pure black and pure white respectively. You can also use the "Hue/Saturation" effect, by pulling the "Saturation" slider all the way down. Another way is using the "Tritone" effect: just use the default setting but change only the Midtone to a color whose hexadecimal value is 808080, essentially a perfect mid-level gray (you can fill those numbers

on the Hexadecimal field of the Color Picker dialogue). Or, if you want to get hardcore, you can always use the all-powerful "Colorama" effect. But please know that NONE of these methods are accurate in representing the original Luminance value from the colored image, because there is bound to be slight differences. But if you want to use the Luminance value, you can simply use the Color image in its original form, just make sure to tell ShapeShifter to use the Luminance channel.

## THE "FRACTAL NOISE" EFFECT

You can find this effect from the "Noise & Grain" category on the Effects & Presets panel. This effect is mightily useful if you want to create an organic looking texture for your 3D object, or, to create organic looking pro-

trusions from Displacement Mapping. Please read the extremely thorough explanation about using this powerful effect [here](#) (jump to FreeForm Pro's chapter).





## THE “COLORAMA” EFFECT

You can find this effect from the “Color Correction” category on the Effects & Presets panel. This is a colorizing effect similar to “Tint” or “Tritone”, although 100 times more powerful! You will need this effect once you have gotten comfortable with using the “Fractal Noise” effect as described

above. This effect will colorize the grayscale/black-white texture that results from the Fractal Noise, so you can use it practically as the texture on your 3D object. To read an extremely thorough instructions on how to use this effect, please jump [here](#) (toward FreeForm Pro’s chapter).

## THE “BLOCKS” ANIMATION PRESET

You can find this Preset from the “Animation Presets” folder of the Effects & Presets panel. This is used for creating animated blocky shapes that have three different colors, replacing the original appearance of your layer (but retaining the layer’s shape/Alpha). In regards to ShapeShifter AE, you can use this Preset to spice up your Displacement Map layer. This Preset can be used on a composite of layers at once by using Precomp or Adjustment layer (only the shape area, i.e

the Alpha will be recognized, if using such composite layers). What you must pay special attention though, is the “Radius” control on the “Minimax” effect there on the Effect & Controls panel, because sometimes when using default value you can’t even see the blocky shapes at all, just white all over. Also, you can change the blocks’ color using the Tritone effect there already on the Effect & Controls panel.

## THE “STROKE” EFFECT

You can find this effect from the “Generate” folder of the Effects & Presets panel. You can use this effect to create a visual appearance for your Mask path. Normally, Mask paths are not visible as pixel/imagery data, but with this effect you can make them appear

as strokes. In regard to ShapeShifter AE, you can use this effect to further spice up your Displacement Map image, even by animating the strokes, just be creative. So, here are the steps to use this effect:

**01.** Draw a Mask or multiple Masks on any kind of layer. And then apply this effect on the layer.

**02.** On the Effect Controls panel, look at the “Path” dropdown to set which Mask you want to use. Or, you can use the checkbox “All Masks” if you want to

**03.** Use the “Color” control to choose the stroke’s color, use the “Brush Size” to change the size of the stroke, and “Brush Hardness” to feather the stroke although

**04.** You can also animate the drawing of the stroke by keyframing the “Start” and “End” controls, very similar to using the “Trim Paths” operation in Shape Layers. And if you have multiple Masks, you can animate the drawing of one Mask

**05.** The “Spacing” control is similar to Brush Spacing in Photoshop, where higher value means less dense brush stroke thus

**06.** On the “Paint Style” dropdown, if you choose “On Original Image”, the original layer that you applied the Mask to will be shown, and the Mask’s modes such as Invert, Subtracat, etc will also affect the appearance of this layer, as normally would, but not affecting the appearance of the stroke. If you choose “On Transparent”, only the stroke will be shown,

use multiple Masks. Immediately you can see the strokes appearing where the Mask paths are.

the feathering is very subtle. “Opacity” will reduce the transparency of the stroke.

after another instead of all at once, by using the checkbox “Stroke Sequentially” at the top of the panel. Masks on the upper stacking order in the Timeline will be executed earlier than the ones in the bottom.

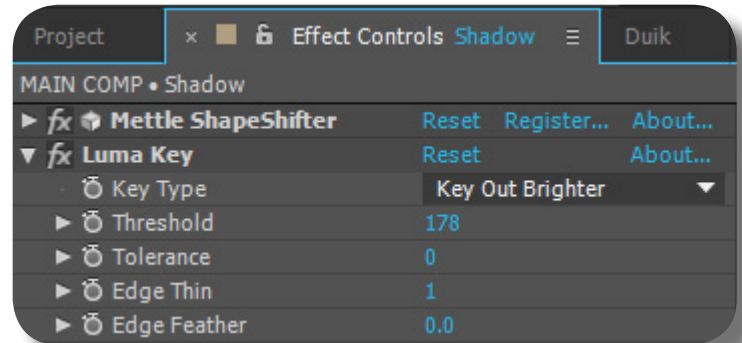
revealing the dots/circles that comprise the stroke.

the original layer will become completely invisible. And lastly, “Reveal Original Image” is similar to “On Transparent”, but instead of the stroke’s own color, it will reveal the image of the original layer where there are strokes: any previous controls still apply normally, except the “Color” control.

## THE “LUMA KEY” EFFECT

This “Luma Key” effect will be useful when we’re discussing about casting the Mesh shadow on another object, which will be the topic of the next Chapter. This effect will “key” your footage/image based on the luminance/brightness values of the layer. Similar to the “Extract” effect, this effect is good for keying out your layer if the background & foreground images

have quite a difference in brightness, i.e the foreground is dark/black and the background is light/white, vice versa; which is the exact situation when we’re doing the “shadow casting” method described in the next Chapter. So, to use this effect for keying:



**01.** On the “Key Type” dropdown, you decide whether you want to remove the brighter areas, in which you choose

“Key Out Brighter”, OR, remove the darker areas, in which you choose “Key Out Darker.”

**02.** After that, crank up the “Threshold” control to start removing the bright/dark areas.

**03.** The “Edge Thin” control expands or shrinks the resulting matte, similar to the Matte Choker function.

**04.** The “Edge Feather” control, of course, will feather the edges of the resulting matte.

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# CHAPTER 15:

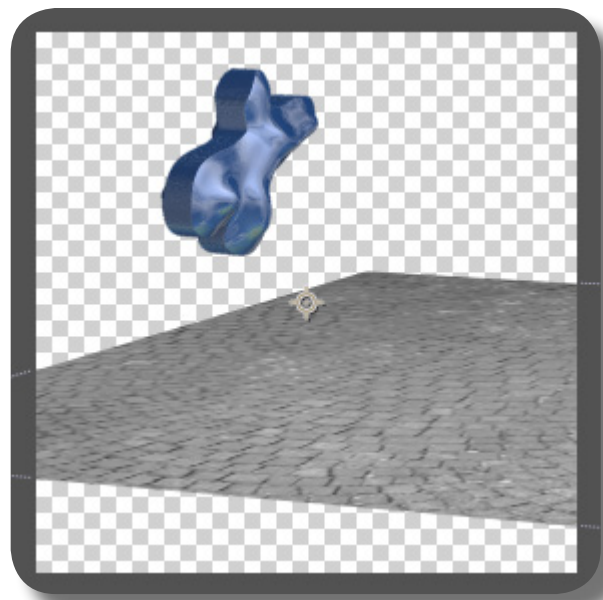
## Casting Shadow on Another Object



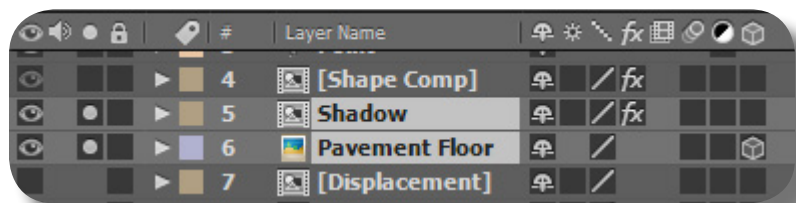
As you may already know, a 3D object from ShapeShifter AE can only cast shadow on itself, so using this trick we can make the 3D Object to cast shadow on another object in the Composition, such as floor or wall, or actually any surfaces, not just the flat ones. And it's important to note that we're not using any external plug-ins to achieve this. The resulting shadow is realistic, conforming to the shape, size, and perspective of the 3D Object in connection with the positioning of AE Light. Please note that this technique is applicable to FreeForm Pro too. So without further ado, here are the steps:



- 01.** First, of course you have to create the 3D Mesh. And also you must create the floor or wall object (just simple flat 3D layer). Please note that the 3D Mesh can be fully animated using the “3D Transform” group.



- 02.** Duplicate the Mesh layer (the layer that you applied ShapeShifter to), and rename this layer as “Shadow” for clarity’s sake; place this layer BELOW the original layer on the Timeline. And also let’s SOLO this duplicate layer and the floor/wall layer.



- 03.** Let’s go to the Effect Controls panel of that duplicate layer (the “Shadow” layer): here you want to apply a Reflection Map layer to the 3D Mesh; you must use a pure-white Solid layer for this Reflection Map layer. The color pure white here is very important. Now go to the “Material Properties” group, and crank up 100% the “Diffuse” and “Reflectivity” controls. This is to make the texture of the 3D Object as pure-white as possible, contrasting to the shadow color that we will create.

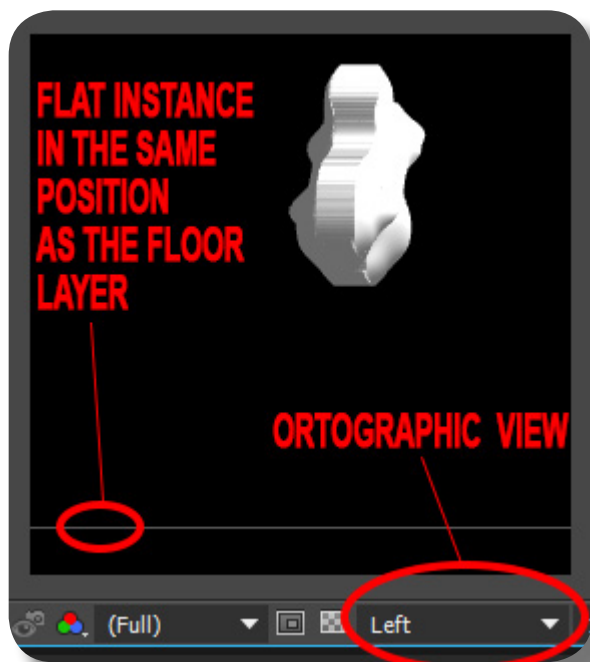


**04.** Still on that duplicate layer (the “Shadow” Mesh), go to the “Generator” group, and input a value of 2 on the “Grid Size X” control, this way we are creating another instance of the 3D Mesh. Using “Grid Size X” control here is important because we can then manipulate the instance freely, using both the “Grid Offset X” AND the “Instance Increment X/Y/Z” controls. If you’re using “Grid Size Y/Z” controls, you can’t manipulate the instance using “Instance Increment” controls.



Now that we have created another instance of the “Shadow” 3D Mesh, let’s rotate this instance so it’s lying on its side/belly, and then squash this instance down to make it flat: to do this, go to the “Incremental Rotation X” and input a value of 90 degree, and go to the “Incremental Scale Z” and input a very low

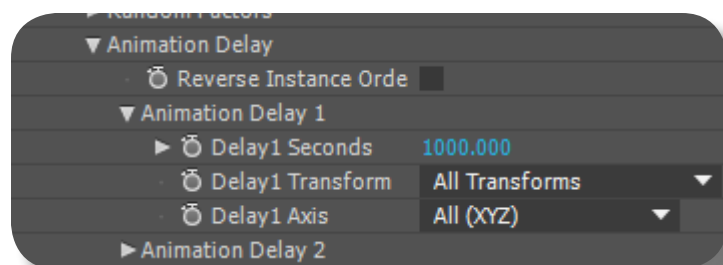
value like 1%. Rotating the 3D object to lay flat on its side before flattening it is very important especially if you’re using ShapeShifter, because you don’t want the extruded surface to “dirty” this pure-white flattened instance, since you know that extruded surface has its own quirks when it comes to its own texture.



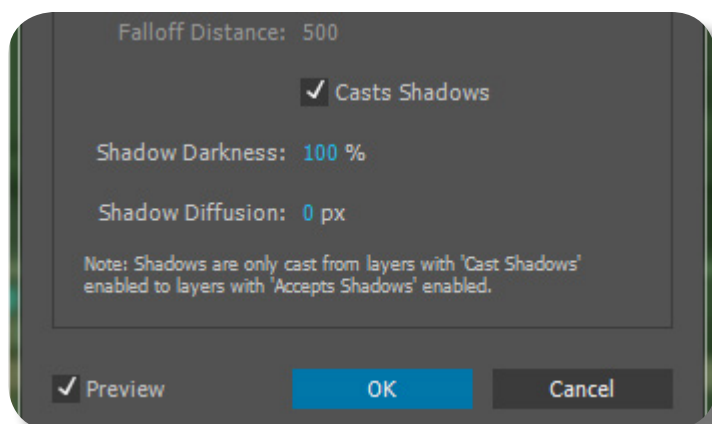
Now that we have a flat & pure-white instance, let’s stretch it out so large that it covers almost the same area as the floor layer; to do this, first use the “Incremental Scale X & Y”, and then use the “Uniform Scale X & Z.” Now, let’s position this flat object so it conforms roughly to the Floor Layer; to do this, use the Orthographic view Side or Front, and manipulate the “Instance Increment Y” control so the flat object is in the same Y position as the floor layer; you can see both the flat object and the floor layer faintly from this Orthographic view. And then go to the Orthographic view TOP, and manipulate the “Instance Increment

X and Z” controls so the flat object is on the same position as the floor layer and covering the entire floor area, you might want to play with the scaling again if the flat object is too big compared to the floor layer, because if it’s too big, of course it will slow down AE. Thus we have created the “shadow receiver object”. Remember though, if you want to have a wall instead of a floor as the shadow receiver, the mechanism & principle are all the same, only the controls’ axis might be different.

**05.** Now we need to make this flat instance to be completely still/fixed. This is very important if you have animated the 3D Object using its “3D Transform” controls; as you know logically, a wall or floor object should not move at all but stay fixed. To do this, go to the “Animation Delay” sub group (still under this “Generator” group) and input a very high value like 1000 seconds, and choose to delay “All Transforms” and “All (XYZ).”

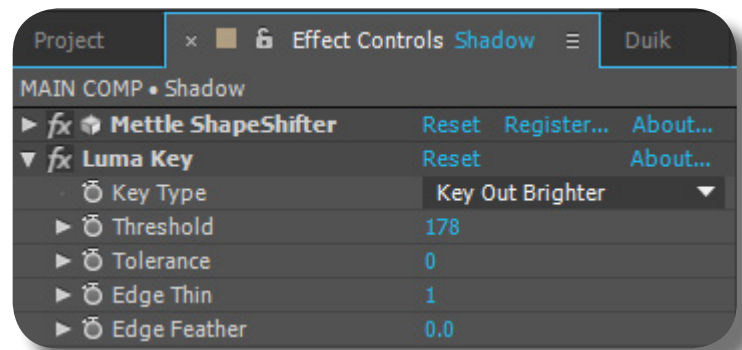


**06.** This step might sound obvious, but make sure that the Light Object is set to Cast Shadow, and also make sure the Shadow Darkness is rather high and Shadow Diffusion rather low. This is important because next step we’re going to “key” the shadow so it’s very wise to make the shadow clear, crisp, & contrasty with the flat object.





**07.** Now let's "key" this shadow so we can get rid of the pure white instance: apply the "Luma Key" effect on this duplicate layer (the "Shadow" layer), place it below the ShapeShifter effect in the Effect Controls panel. Choose to "Key Out Brighter" and crank the "Threshold" control until you can't see the pure-white flat instance, only the dark area i.e the shadows are left. Scrub through the Timeline and see if the resulting matte leaves any white fringes or other problems; if it does, manipulate the Luma Key settings as necessary.



**08.** Now, un-SOLO the "Shadow" layer and Floor layer. And then reduce the Opacity of the "Shadow" layer. You can spice up this "Shadow" layer by adding the "Fill" effect to it, so its color is good enough. You can also blur the shadow by applying a blurring effect to this Shadow

layer; please NOTE that you should not blur the shadow using the Light layer's "Shadow Diffusion" control, because it will throw off-balance the keying that we've made. Now, you can savor the result.

**09.** VERY IMPORTANT NOTE: If the shadow receiver object is not a flat surface like floor or walls, but having contours, you can use the "World Space Deformations" group to deform the pure white

instance, to conform with the contour of that shadow receiver object. You can use multiple bounding boxes and each of them covering different parts of that pure white instance.

This "shadow casting" method is very preferable because it allows you to move the AE Camera and Light, and yet the shadow is still fully realistic, unlike if you're using other simplistic "shadow casting" tricks.

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# CHAPTER 16:

## Copying Another Layer's Movement

Previously we have already discussed how to make the 3D Object from FFPro to follow the Rotation of another 3D layer (a 3D Null object); you can read about it [here](#) (jump to FreeForm Pro part of this book). But Ro-

tation is easy, because it doesn't use any coordinate systems, or any offset values. Now we're talking about following NOT ONLY a Rotation movement, but also the Position movement of another 3D layer.

When it comes to FFPro/SSAe, the coordinate system is different from the AE Comp, with the ORIGIN POINT i.e [0,0,0] being normally in the very center of the Comp instead of the top left corner. Not to mention that FFPro/SSAe separates its Position dimensions into three different controls. To complicate things further, ShapeShifter AE doesn't have the red Anchor Point marker as in FreeForm Pro. So, in this example, we'll

be looking at how to make an SSAe object follow exactly the movement of another 3D layer. Because ShapeShifter doesn't have Anchor Point marker, you'll know how to solve the problem here. So, assuming you have already created a 3D object using ShapeShifter AE, and the 3D layer that you want to mimic is fully animated/keyframed, here are the steps:

**01.** First, the most crucial step, is we want to make the 3D object to be in the exact same position and size as the Animated Layer, including its Anchor Point location (“Animated Layer” is the layer that you

First thing first, you must Scale the 3D Object down using the “3D Transform’s” SCALE controls, to roughly match the Animated Layer’s size; to do this easi-

Now, the most important thing, we must manipulate the 3D Object so its position and Anchor Point are exactly the same with the Animated Layer’s. First, using Guides, pinpoint the exact location of the Animated Layer’s Anchor Point. And then, since SSAe doesn’t have a graphical icon to mark where the 3D object’s Anchor Point is, we must use FreeForm Pro; so, apply FreeForm Pro to the same layer that you apply SSAe to, and disable the ShapeShifter effect for a while now. And then on FFPro’s “3D Transform” group, scale it down using the same value as previously. Now let’s move the Red Anchor Point marker toward the location of the Animated Layer’s Anchor Point, as you already know, you can do this by

want to mimic the movement from). Before doing anything else, make sure your camera position is in Orthographic view, or if you’re viewing from the side, simply turn off the Camera layer.

ly, you can just look at the Animated Layer’s Scale value and apply that same value to the 3D object.

manipulating the “3D Transform’s” Position X and Y controls; and once the Red Anchor Point is in place, now position the FreeForm’s shape/object to match the position of the Animated Layer, by manipulating the “3D Transform’s” Anchor X and Y controls, as you already know. Once everything is in place, you can now copy paste the “3D Transform’s” Position X, Position Y, Anchor X, and Anchor Y values, from FreeForm Pro toward the corresponding controls in the SSAe effect. Now, disable FreeForm Pro, and re-enable SSAe. You can see that the 3D object is in EXACTLY the same position & anchor point location with the Animated Layer.



**02.** Now begins the part where we must “import” the Animated Layer’s good animation into the 3D object. First you have to separate the dimensions of the Animated Layer’s POSITION property, this is important because FFPro & SSAe

also use separate dimensions (separate axis) for its various transformations. You can separate the dimension by right clicking the Position property of the Animated Layer, and choose “Separate Dimensions.”

Now you might think that we can just copy-paste the keyframes from the Animated Layer into the 3D Object, but we CAN’T DO THAT just yet, because the keyframes on the Animated Layer, if you use them raw on the 3D object,

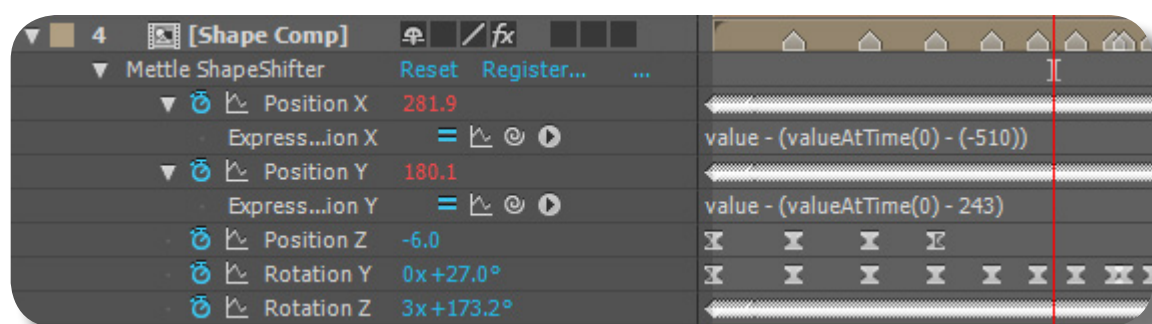
will destroy again the correct positioning & anchor point you have achieved from the previous step, because these keyframes are from a different Coordinate system.

You might also think that we can just copy-paste the keyframes and then do Offsetting by dragging the keyframes’ values (i.e you select all keyframes, place the CTI exactly on one of them, and DRAG the value of the controller/property that holds those keyframes). But we can’t do this, because the “3D Transform’s” Position axes have been

separated into its own properties, thus there’s a good chance of breaking an axis’ ratio/relation to the other axes if you manually drag the keyframes’ values. Thus, to solve this problem, you must do Offsetting using Expression instead of manual-dragging; this will be discussed in the next step.

**03.** So, before we paste the keyframes, we must write Expression on the 3D Object’s Properties where the keyframes will be pasted into, so that the keyframes’ values will be offset. For example, we want to paste the Animated Layer’s “X Position” keyframes into SSAe’s “Position X” property: first, we must

note down/remember the current value of that SSAe’s “Position X” property, for example it says -510. Now, Alt + Click that property, and write this expression: `value - (valueAtTime(0) - (-510))`. And now you can safely paste the keyframes on that Property.



What that expression means is essentially this: we have the keyframes' values, which happen in a location that we don't want, so we have to **OFFSET** the keyframes' values: **SUBTRACT** the keyframes' values by the **DIFFERENCE** between this Property's original value and the keyframes' value at frame 0; frame 0 here is important, because SSAe's "Position X" original value is not changing/keyframed, while the keyframes' value is of course changing/keyframed, so to know the **TRUE DIFFERENCE** between these two

values, we must calculate it from the very first frame. Please note the two operations there: first we find the **DIFFERENCE** between the Property's original value and the Keyframes' value at frame 0, and then we **SUBTRACT** the Keyframes' values using that **DIFFERENCE** that we have found. You have to remember by heart the essence of this expression, because it is very useful not only for this situation, but for other situations where you can't simply Offset keyframes' values by dragging, as you already know.

Now, apply the same technique on the 3D Transform's "Position Y" and "Position Z" properties, and then paste the keyframes. Regarding the Animated Layer's Rotation keyframes, you can copy-paste them toward the 3D Transform's "Rotation X/Y/Z" properties right away, no need to write the

expression, because of course, Rotation animation is all the same regardless of where it happens. Now you can see that the 3D Object has the same exact movement, and in the exact same place, with the Animated Layer. You can now turn **OFF** the Animated Layer's visibility.

## USER NOTES:

[illegible]