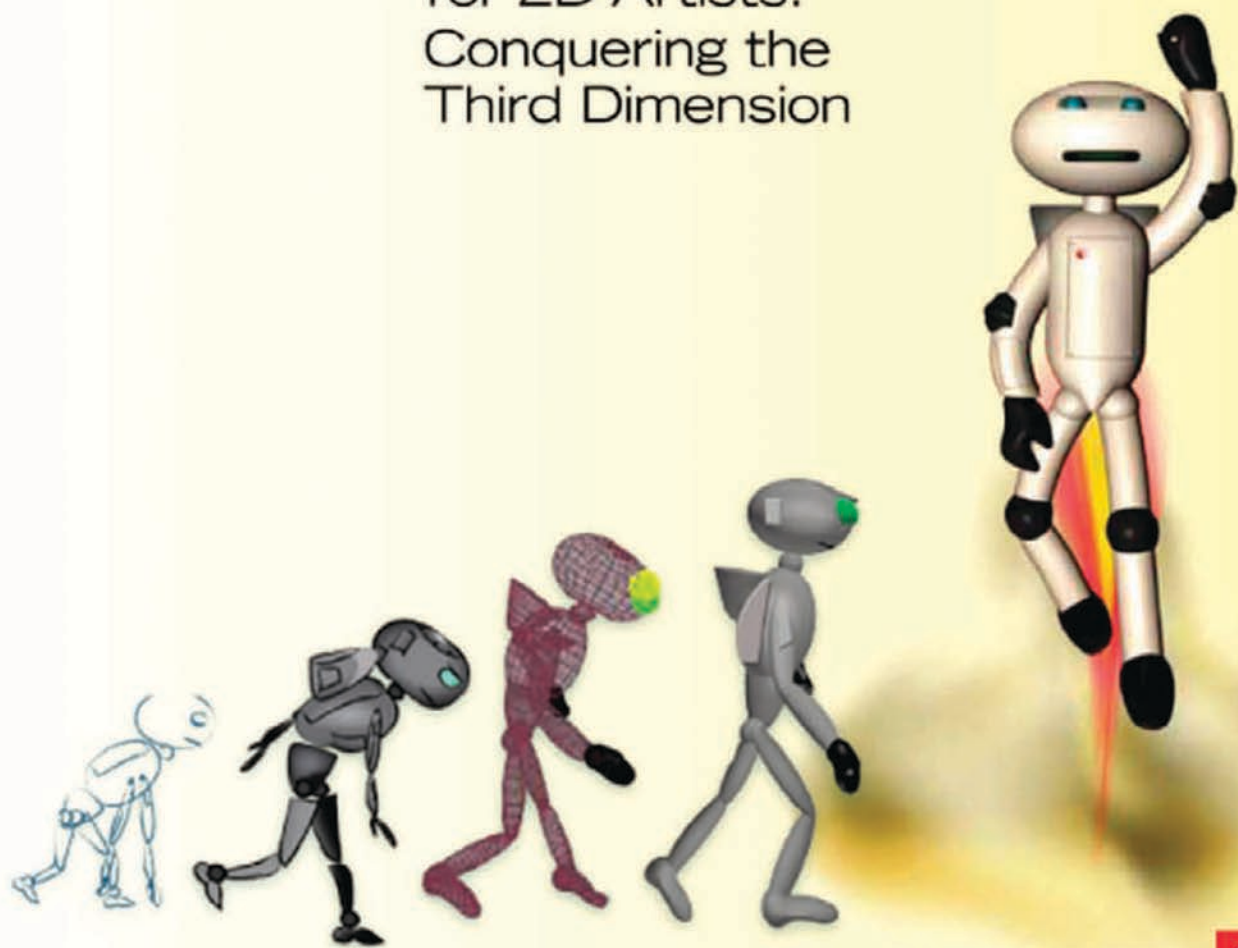


BILL BYRNE

3D MOTION GRAPHICS

for 2D Artists:
Conquering the
Third Dimension



3D MOTION GRAPHICS FOR 2D ARTISTS

Supplementary Resources Disclaimer

Additional resources were previously made available for this title on DVD. However, as DVD has become a less accessible format, all resources have been moved to a more convenient online download option.

You can find these resources available here: www.routledge.com/9781138452909

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3D MOTION GRAPHICS FOR 2D ARTISTS

Conquering the
Third Dimension

BILL BYRNE

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Dedication

To my wife

Suzanne, for her love and support that makes everything I do possible. Thank you for understanding during my lapse of progress on weekend projects.

To my daughter

Elinor, in spite of her best efforts to hinder the writing of this book, through keyboard grabbing and distracting me by being absolutely adorable, it did get finished. Da-da loves you.



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CONTENTS

Dedication	v
Acknowledgments	xii
Chapter 1 Introduction	1
How to Use This Book	2
Chapter 2 The Techniques of 3D	3
Three Dimensions	4
Stacking or Layering	4
Top and Bottom Placement	5
Color	5
Perspective	6
Multipoint Perspectives	7
Depth of Field	8
Defining the Difference between 2D and 3D Computer Graphics	8
Questions about 3D You Were Afraid to Ask	9
What Is a 3D Model?	9
What Is Texture Mapping?	9
What Is Rendering?	9
Why Is Poly Count an Issue?	9
What Is the Difference between 2.5D and 3D?	10
Chapter 3 The Tools of 3D	11
The Essentials	11
Image Editing: Photoshop	11
Motion Graphics: After Effects	12
After Effects 3D Plug-Ins	13
Zaxwerks Pro Animator and Plug-In Product Line	13
Trapcode Particular and 3D Stroke	14
Vector Image Editing	14
Adobe Illustrator	14
3D Software	15

3D Hosts	15
MAXON Cinema 4D	15
3ds Max.	17
Autodesk Maya.	18
Luxology Modo.	19
Blender	20
Other 3D Host Options	21
Specified Tools.	21
Character Tools.	22
Environment Tools.	23
Digital Sculpture.	24
Dedicated Modeling.	26
Mobile Tools	26
Chapter 4 Photoshop 3D	31
Creating a 3D Button in Photoshop	32
3D Tools in Photoshop	34
The 3D Panel.	39
Animating 3D Objects in Photoshop	40
Creating a More Complex 3D Model in Photoshop	42
Creating a 3D Flower Using 3D Mesh from Grayscale.	44
Creating a 3D Scene in Photoshop, and Using After Effects for Animation.	48
Creating Textures.	48
Space Background.	52
Animating a 3D Scene in After Effects.	57
Repousse	61
Chapter 5 Designing for Depth: Illustrator 3D Techniques	65
The Advantage of Illustrator in After Effects.	65
3D Tools in Adobe Illustrator	66
Tutorial: A Very Old-School 3D Type Spin Technique Using Illustrator and After Effects.	67
Creating a 3D Product Shot.	69
Using Illustrator CS5's New Perspective Tool for a Multipane Shot . .	73

Chapter 6 After Effects 3D Capabilities and Plug-Ins	79
The 3D Switch	79
Camera Layers	80
Light Layers	81
3D Photos	81
Importing and Animating 3D Models in After Effects	85
Complete a Sports Logo with a 3D Baseball	88
Organic Lines with Trapcode's Particular	90
Creating a Laser-Etched Logo Effect with Trapcode's 3D Stroke	96
Chapter 7 Beginning 3D for Real	103
Modeling	103
Getting Started with Cinema 4D	104
Views	104
Tools	104
Basic Modeling from a Photograph	107
Changing Views	112
Basic Materials	116
Introduction to Materials in Cinema 4D	116
Introducing 3ds Max	120
Modeling a Stop Sign in 3ds Max	123
Making a 2D Logo 3D in Cinema 4D	128
Chapter 8 Animation in 3D	131
Keyframe Animation	131
Animating the Camera in Cinema 4D	131
Bouncing Ball	135
The Bouncing Ball in 3ds Max	140
Animation of a 3D Logo in Cinema 4D	143
Character Animation Workaround with the After Effects Puppet Tool	147
Chapter 9 3D Typography	155
Using After Effects' Per-Character 3D Text Animation Tools	156
Creating and Animating Volumetric 3D Text with Photoshop's Repousse	160

Creating 3D Type in Cinema 4D	166
Exploding Type in Cinema 4D	171
Creating 3D Type in 3ds Max	174
Text Animation with Zaxwerks Pro Animator	178
Chapter 10 Cinema 4D MoGraph Tools	183
Cloner Tools	184
Cloner Object Tutorial: Modeling an Abstract Sun	185
Fracture Objects	189
Using a Text Object with a Fracture Object and Random Effector	189
Instance Objects	193
Using Text with an Instance Object	193
Text Objects	195
Per-Character Type Animation Using Text Objects and the Step Effector	196
Tracer Objects	200
Creating a Futuristic Comet Using the Tracer Object	200
Spline Mask Objects	203
Using a Spline Mask Object	203
MoSpline Objects	205
Creating 3D Organic Vines with MoSpline	206
MoGraph Deformers	209
Extrude Deformers	210
PolyFX Deformers	211
Effectors	212
Chapter 11 3D Scenes	217
Units	217
Completing Our Pest Control Logo with After Effects	218
Creating a Landscape Scene with Integrated Text	222
Creating a Complete Medical Scene with ZBrush and After Effects	227

Chapter 12 Compositing	233
Creating a 3D Video Wall Using the Object Buffer	233
Getting Great Depth of Field Using Multi-Pass Rendering and After Effects' Lens Blur	237
Deeper Compositing Control Using the External Compositing Tag ...	241
Final Thoughts	245
Index	247

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INTRODUCTION

This book is designed to solve a very specific problem—flatness. Two-dimensional motion graphics designers and animators routinely hit a brick wall. You have these flat objects occupying a manufactured world, and the illusion of depth is just not enough—you want it to turn in *space*. More so, you have a client who is demanding that object turn in space, and you need to meet that request (or, let's face it, someone else will).

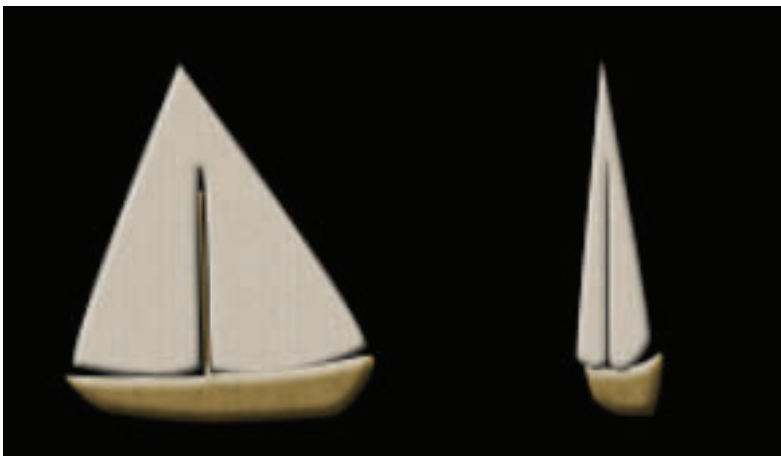


Figure 1.1 2D object turning in 3D space.

This usually leads folks to look for plug-ins for After Effects, or a three-dimensional animation application. Then a new roadblock appears (or several)—how do I use these things? First, 3D is *a lot* more difficult than 2D. Second, beginner resources for 3D software start you from the very, very beginning, and you may not have the time to spend spinning cubes.

This book will explore several options for 2D motion graphics artists. First, we'll take advantage of the new and not-so-new 3D tools in Adobe software, which are quite useful and may solve a large percentage of your concerns. Second, this book will address existing tools that can be added to After Effects, like third-party plug-ins that add 3D functionality to AE. Third, we'll dip into 3D software including Cinema 4D, ZBrush, 3dsMax, and others, starting you in the direction of developing your 3D skill set.

TIP



You may spin cubes in this book; I promise to keep it brief.

How to Use This Book

If you are familiar with either of my two previous textbooks, *The Visual Effects Arsenal* (Focal Press 2009) and *Creative Motion Graphics Titling* (coauthored with Yael Braha; Focal Press 2010), then you won't find what I am about to say all that surprising. My teaching motivates my textbook writing. I am as fascinated by *how* people learn as I am by *what* they learn.

Students and professionals want books that address specific problems and solve them. They are not nearly as motivated by the guts of a software package as they are by what it can do for them. This book is designed to take people who know 2D motion graphics and animation and get them on the right path to learning 3D. This book won't teach you everything you need to know about 3D motion graphics—learning everything about 3D animation is a lifelong pursuit.

The aim of this text is to get you started in 3D by introducing you to available options that can be added with relative ease to an existing 2D animation skill set. In many ways, this book is designed to be 3D animation from the very, very beginning. This book does assume some foreknowledge of standard 2D tools (such as Adobe After Effects, Adobe Photoshop, and Adobe Illustrator). 3D packages will be introduced like 3dsMax, Cinema 4D, ZBrush; and After Effects plug-ins like Trapcode Particular, Trapcode 3D Stroke, and more.

Even though you will be introduced to numerous tools that have infinite applications, techniques will be the focus of this book. What's the point of learning an incredibly complex tool if you don't get to see what it does?

THE TECHNIQUES OF 3D

Creating the Illusion of Depth

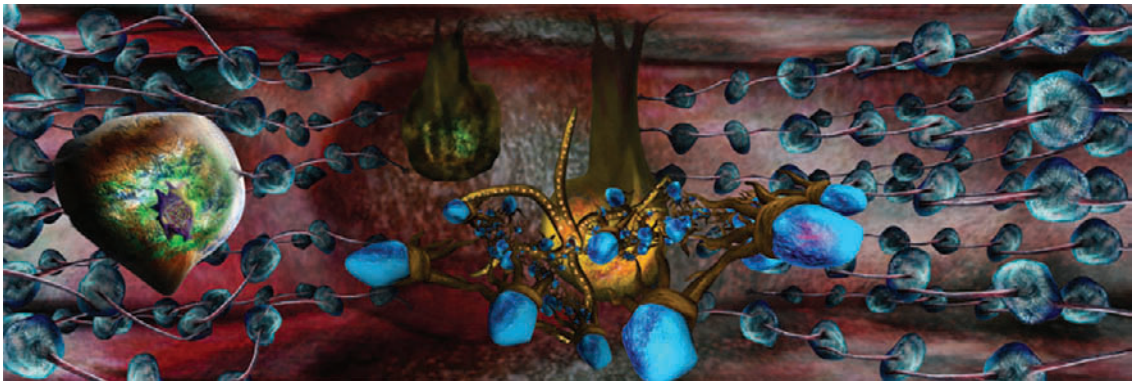


Figure 2.1 *The Grid Is Broken*
digital painting by Bill Byrne.

The essential point of creating 3D art and animation is to create a believable world. That world can be completely false, but the audience needs to buy into your reality to some degree or it will be meaningless to them. Even the strangest realities will need to have some signposts for the audience to be able to get some sense of it. In any case, the 3D artist must build a world, a world that is also a stage.

What's the difference? A world exists, and does things with or without the viewer. It pays the viewer little mind. A stage contains a representation of something that resembles the world for the benefit of the viewer. It's a show. Art is always a presentation for the viewer. Flat art, such as drawings, photographs, films, and paintings have always had a limitation in that they pretend to contain true depth but are actually flat illusions of depth.

Why does this matter to you? Well, 3D animation will take the real world and recreate it within a flat space. It matters to you because in this day and age, when that “wow” factor is few and far between, what better way to engage viewers than inviting them into a completely imagined world that they can relate to and that is a complete work of your own fantasy and design?

Three Dimensions

Objects in our world have three dimensions: height (represented by X space in Figure 2.2), width (Y), and depth (Z). Nonsculptural, flat art represents height and width easily because flat art is two-dimensional. Now you may be thinking, I have seen three dimensions in flat art, but that actually is not true. You've seen the *illusion* of depth. In fact, there are a series of techniques that are employed to make something appear to have depth that in fact does not.

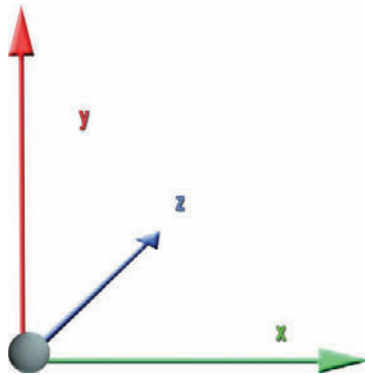


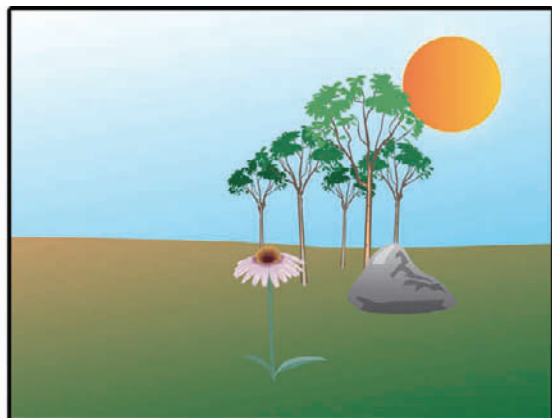
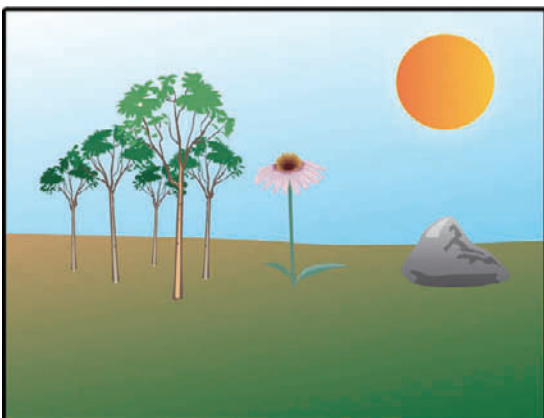
Figure 2.2 Three dimensions.

Stacking or Layering

Figure 2.3 The image on the left shows various objects unstacked. The image on the right shows the same objects stacked. Notice how by simple placement of the objects on top of each other the image starts to take on a certain amount of depth.

The first of these techniques is *stacking* or *layering*. What this simply means is placing objects on top of each other. Objects that are closer to the viewer should be on top of objects that are farther from the viewer.

Stacked or layered objects overlap others and this establishes distance quickly and effectively.



Top and Bottom Placement

The vertical order in which objects are arranged in a frame influences the perception a viewer has of how close or far an object is from them.



Figure 2.4 In a landscape, the higher an object is placed in a frame, the farther it appears to be from the viewer.

However this rule varies based on the content of your frame. For example, in [Figure 2.4](#), an exterior space or landscape's depth is determined by placing objects closer to the top of the frame if they are farther away from the viewer. In an interior space, the objects at the top of the frame appear closer to the viewer; see [Figure 2.5](#).

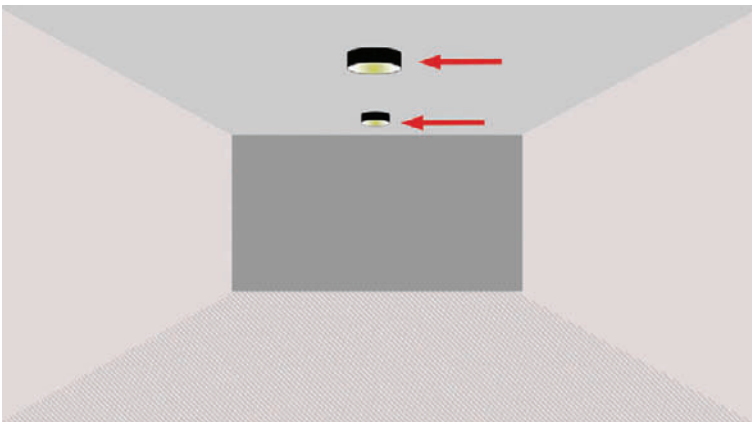


Figure 2.5 In an interior space, the ceiling reverses the rule we discussed for exteriors—the top of the frame is closer to the viewer. Think of a ceiling and floor as a landscape with a ground area at the top and bottom of the frame.

Color

The use of color can also create depth in an image. Objects closest to the viewer would be the most saturated, with the brighter colors. Objects farther away will be darker or less saturated. In landscapes such as [Figure 2.6](#) you will see that the mountains in the distance look as if they have a blue-gray tint.

Figure 2.6 Color saturation levels also create depth in an image. Notice in this landscape photo that the far-off mountains have a blue-gray hue.



Perspective

Perspective is quite possibly the most effective technique for creating depth in a flat image. Lines that occur naturally within an image moving toward a *vanishing point* create perspective. The vanishing point is where the lines creating perspective converge, gesturing a continuation that is no longer perceived by the human eye. Perspective lines can be used as a guide to keeping objects following a diminishing scale. Let's say we take two objects that are believed to be the same size by the viewer. The object that is larger in the frame will be perceived as closer to the viewer.



Figure 2.7 Photographic representation of depth and perspective.

Multipoint Perspectives

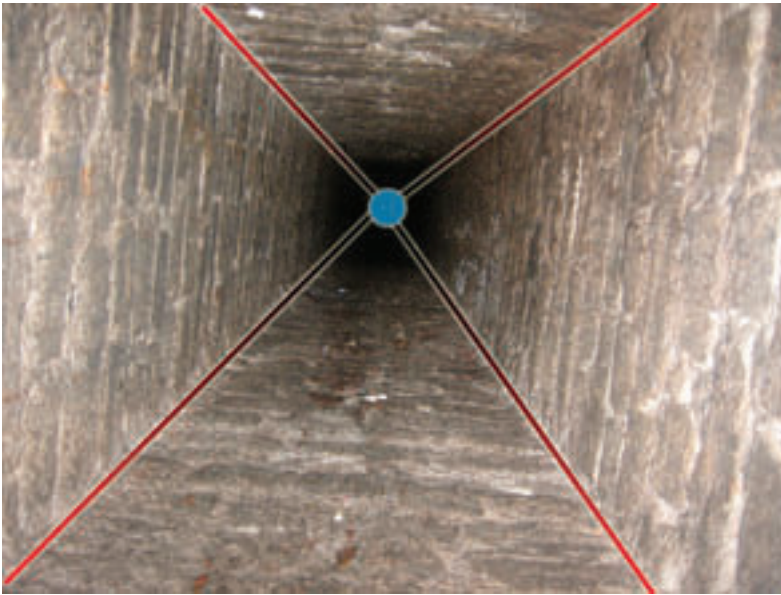


Figure 2.8 The blue point is the single vanishing point.

One-point perspective is employed for classic road-goes-on-forever, railroad-tracks-to-infinity-type images, because it employs a single vanishing point. Every line in the image meant to indicate perspective moves to that vanishing point.

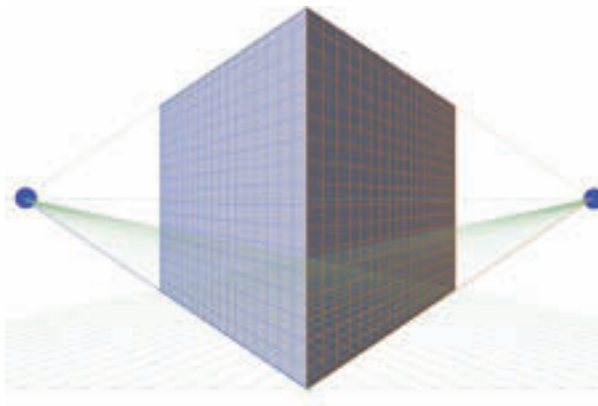


Figure 2.9 A two-point perspective uses two vanishing points to demonstrate the depth of an object that has two separate planes.

Two-point perspective would be used to take an object in perspective and rotate it on the horizontal axis. Think of a photograph of the corner of a building. The two sides of the building are following two separate planes, and therefore the perspective should be adjusted accordingly.

To demonstrate a top-down bird's-eye view of an object, *three-point perspective* can be employed. This time there would be three vanishing points employed to present the object (see [Figure 2.10](#)).

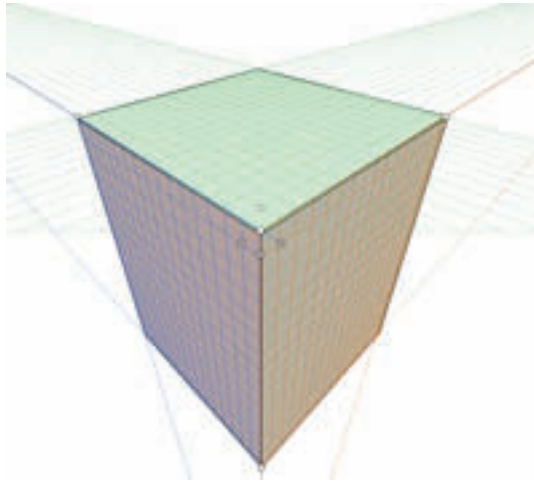


Figure 2.10 A three-point perspective uses three vanishing points to show a top-down view of an object.

Depth of Field

By emulating the behavior of the camera, we can also create a sense of depth. The camera's lens works like a human eye; the objects in focus appear to be closer than objects that are not sharp. However, cameras also allow us to flatten space by leveling the amount of change of focus within an image or depth of field.

Defining the Difference between 2D and 3D Computer Graphics

The techniques just discussed work when applied to 2D art in creation of the *illusion* of depth. We will discuss several techniques for creating the illusion of depth in 2D graphics, but what about when we need to get past that? 3D graphics software is designed to create virtual worlds like our own real one, within our computers, to handle all of this illusion stuff for us. So rather than painstakingly emulate the behavior of light, the software tools we will discuss will be able to apply algorithms to this for us.

I know what you might be thinking: If I can take a photograph of the real world, why is that considered 2D when a scene built in Maya is considered 3D? The answer is essentially the following: A photograph on a computer monitor is just flat pixels assigned to specific positions. A 3D scene uses wireframe structures that

can be viewed from any angle, by moving a virtual camera. As discussed earlier, it is a virtualization of the real world on your computer that can mimic our real world as closely as the artists involved are willing to make it.

Questions about 3D You Were Afraid to Ask

We 3D artists can be an elite bunch with little time for questions from noobs. This section is designed for you beginners, with some of the best answers I could come up with for very common questions.

What Is a 3D Model?

Models are mathematical shapes formed into the surface of 3D objects. Vector objects are created by the positions of points in a 3D space, and then a raster graphic is assigned that geometric object to define its appearance. So the vector wireframe can be moved around within the space where its size, angle, and position can be adjusted at any point in time. Models are either built by hand or from a scanned object. In this book we will address the process of making models by hand, as in many cases it is just not possible to use a 3D scanner on an object (like a building).

What Is Texture Mapping?

A model is a wireframe with a surface. That surface can be a flat color, an image that was drawn or painted, or even a photograph. So texture mapping is the process of applying a raster image surface to a 3D model. Several different maps can be applied to the same object to create what is known as a *multitexture*. These would typically include a *UV Map*. UV mapping is the process of creating maps where specific points in a 2D texture are plotted to specific locations on a 3D model.

What Is Rendering?

Rendering is the process of creating a 2D image, be it moving or still, of a 3D model or scene consisting of a number of models.

Why Is Poly Count an Issue?

Every 3D object is made of polygons. A sphere can be infinitely subdivided into a larger number of polygons. So, the more polygons used, the more complex the surface of an object can be. However, the more complex the objects are, the longer it would take to render. Video game designers typically go for lower poly

counts because they want the rendering to happen more quickly (since rendering in a game is real-time). Very high poly counts mean the more photo-real the 3D object will be.

What Is the Difference between 2.5D and 3D?

2.5D refers to techniques that software will use in order to make a hybrid that lives somewhere between 2D and 3D. For example, Adobe After Effects has a 3D switch that allows users to turn a 2D object in 3D space. That object is still completely flat—it is just turning in 3D space.

THE TOOLS OF 3D

We are assuming that you are a knowledgeable 2D motion graphics artist. We figure you are someone who is looking to branch out your skills by adding new software skills. This book does assume a background with the Adobe CS suite, mainly Adobe Photoshop, Adobe Illustrator, and Adobe After Effects. The first few chapters will address techniques for these three packages that are either (1) newly added to the software or (2) classic techniques that users may just not be aware of. Photoshop in its last three versions has added significant and powerful 3D tools. After Effects has supported 2.5D for several versions. With version CS4 it also supports Photoshop 3D files. Additionally there's a long history of add-on tools or plug-ins that add 3D support.

However, this book also addresses how you would dip into other software to get tools like After Effects, which the Adobe suite just doesn't come with. So we will look at 3D hosts, modeling tools, digital sculpture tools, and other options for working some 3D into your motion graphics. The list and advice that follow are in no way intended to be comprehensive or set in stone. At every opportunity I try out a tool or software package that may improve my workflow and I encourage you to do the same. You know your own needs better than anyone else, and part of the theme of this text is managing your expansion into 3D on an as-needed basis.

The Essentials

Image Editing: Photoshop

Adobe Photoshop is an absolutely essential software package for 3D or 2D, or for any person who wants to make an image on a computer. There was a time when people used it primarily and only to edit photos but that's a ridiculous notion today. 3D artists have been using it forever, and now with some new tools there are more reasons to own it than ever.

I remember being completely blown away when Photoshop CS3 allowed you to import Google Sketchup models. CS3 also

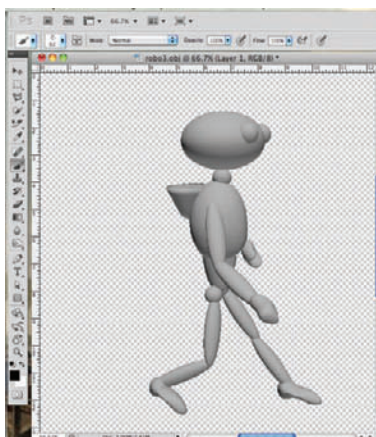


Figure 3.1 Editing a 3D model in Photoshop.

introduced a keyframe-based animation timeline, which is much like After Effects'. CS4 completely blew the lid off of that by allowing users to paint directly on OBJ models. Now, CS5 has its own 3D extrusion tool, *Repousse*. It's starting to feel as if Adobe thinks that someday this could be some kind of meta-program.

Additionally, editing raster files for UV maps has been a basic role of Photoshop in a 3D workflow for a long time. Generating and painting textures as well as working with photographic images are also among this powerhouse program's strong suits.

Motion Graphics: After Effects

Adobe After Effects (AE) was once pitched as Photoshop on a timeline. This ability of After Effects has made it so useful that it has become ubiquitous in the motion graphics, visual effects, and animation industries. After Effects works seamlessly with the Adobe suite, most notably Photoshop, Illustrator, Premiere Pro, and Flash (to some extent).

It has a raster-based engine, but it will take assets that are raster, vector, video, or audio. 3D models can be imported, but they would have to go to Photoshop first before they could be used in AE. AE is by nature a 2D/2.5D keyframe animator with limited true 3D capabilities. In addition to that it can be used for compositing and color correction.

One of AE's best features in its expandable toolset is allowing users to purchase third-party plug-ins. Third-party plug-ins are available from many different publishers for varying costs. We'll get a little deeper into that end later in this chapter.

AE's main competitor is Apple's Motion. However, after being in publication for about seven years, Motion has failed to unseat After Effects' position at the top of the heap.

After Effects 3D Plug-Ins

After Effects' customizable plug-in system has led to the development of lots of great add-on tools. Following are some of the best tools for adding 3D functionality to After Effects.

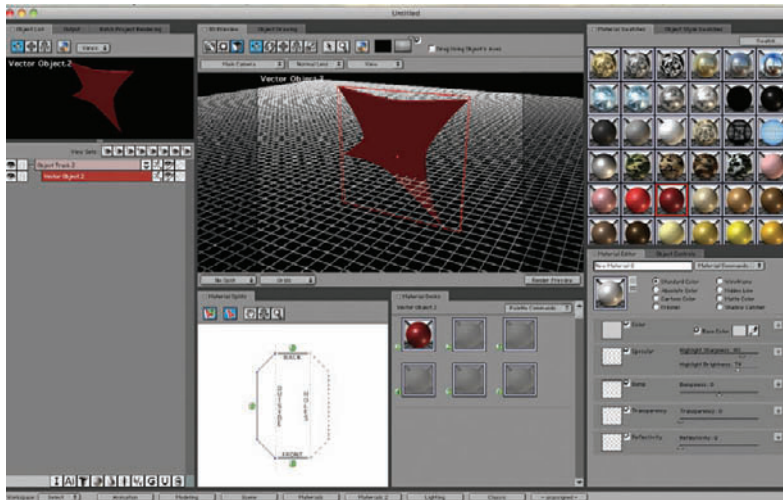


Figure 3.2 Zaxwerks Pro Animator.

Zaxwerks Pro Animator and Plug-In Product Line

Zaxwerks' 3D plug-ins for After Effects have been adopted by the industry, with good reason—they add a large number of 3D capabilities with very little learning curve. The top of their product line is the Pro Animator plug-in/stand alone application.

Pro Animator came from the features they have long offered in their classic 3D Invigorator plug-in. Pro Animator is a quick and easy 3D engine that can be run as a stand-alone application or an AE plug-in. The interface, while sporting a late-1990s-looking GUI, is a powerhouse with intuitive controls for bringing in 3D models from larger 3D packages, creating simple extruded models with controls that will be familiar to any experienced Adobe user.

Additionally Zaxwerks has 3D Flag, a quick way to make a 3D flag of any layer in AE. 3D Serpentine is another plug-in, designed to extrude 3D paths, which is great for making trails, film-strips, and ribbons. 3D Reflector will quickly generate reflections. 3D Layer Tools is an exciting tool for breaking up one layer into several without jumping to Photoshop and controlling them in Z-space.

Not all of these are essential, but they are all very useful. Pro Animator in particular is very valuable to most AE users interested in adding 3D. Unfortunately, even this far into the CS5's shelf life, there's no version of Pro Animator or 3D Invigorator that is compatible with CS5 for OSX. Luckily the stand-alone versions will work.

Trapcode Particular and 3D Stroke

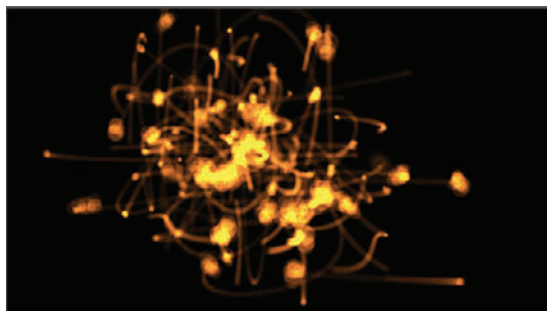
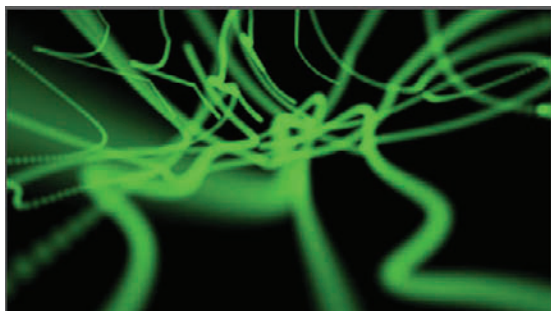


Figure 3.3(a) and (b) Trapcode plug-ins are all the rage in broadcast design.

A few years ago, the motion graphic images created on TV were literally dominated by Trapcode plug-ins (and images that looked like Trapcode plug-ins). The two most notable were the classic *Particular* and *3D Stroke*. *Particular* is a full 3D particle and dynamics package for After Effects. It is a wonderful tool, and if there are any plug-ins for After Effects that are a must-have, *Particular* is at the top of the list. Also, Trapcode makes *3D Stroke*, which is kind of like the existing *Stroke* plug-in that can animate a line on a path, but *3D Stroke* can do it on the Z axis.

Vector Image Editing

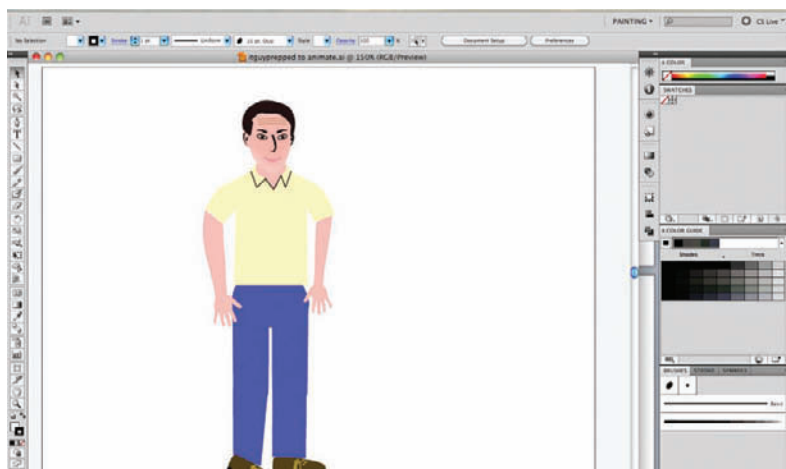


Figure 3.4 Illustrator.

Adobe Illustrator

It's optional for 3D but most motion graphics designers pretty much need to own Adobe Illustrator. After Effects works with Illustrator just like Photoshop: you use the software to supply AE