

cliffhanger visuals

3-point light tutorial

2005 copyright cliffhanger visuals

<http://www.cliffhanger.nl>

3D visualisatie 3D illustratie 3D animatie

Introduction



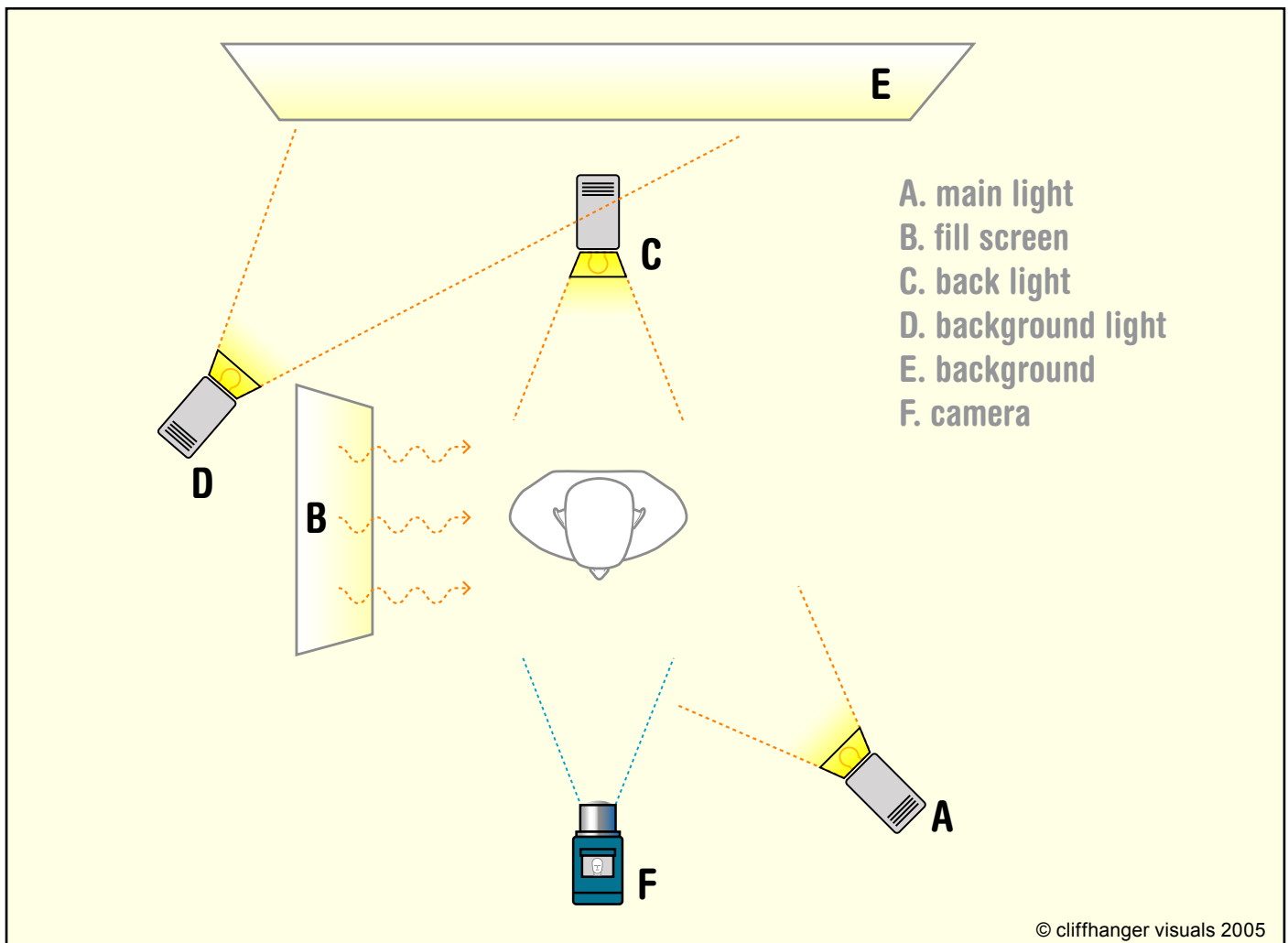
This tutorial aims to cover the subject of 3-point lighting in 3D software. I will use Cinema4D but any major package will handle the technical part in a similar fashion. I'll try to preserve the link between lighting in photography and in 3D in this tutorial, as many 3D-creatives make use of the typically photographic way 3D-software can handle light, apart from the extra tricks it can do, and because of the important role of realism in the 3D-community.

One thing almost every both hobby and professional learning book on photography presented you with, back years ago but still today in digital photography, is the classic three-point light set-up.

A three-light set is basically meant to place an object or a person into a neutral but neat ambiance without the help of natural light. The image below illustrates the top view:

The **main light** (A) is the brightest in the scene and is pointed diagonally at the object, tilted somewhat

downward to mimic the light of the sun. A second light, the **fill light** (B), is placed at the opposite side to prevent half of the subject from remaining in the dark. (In the illustration a reflection screen is used for that purpose.) The third light, or **back light** (C), is placed behind the object on a relatively high tripod to cast light onto the contours of the object that will distinguish it from the background. In the illustration, a background light (D) casts additional light on a background screen.



But what exactly do these lights do, physically and psychologically? What is their effect on the image? The best way to illustrate that is to extract them from the set-up and show them separately:



The Dutch painter Rembrandt van Rijn is famous for the way he used light.

Even today he would be in an important league of artistic photographers because of his use of a sole, Main Light.

This is Rembrandt in the last stage of his life. The lighting isn't really making things look better for him. It is beautifully painted but the idea behind it is really straightforward: *photons*, so you can see something, so you can see the old man.



In this studio shot on the set of *The Aviator* by Miramax, huge reflection-diffuse screens are being used to evenly light the scene to be able to chroma-key the car with passengers out of the green background and place it into a different surrounding.

In this example the function of fill lights is taken to its extreme: to make the scene evenly and softly lit.

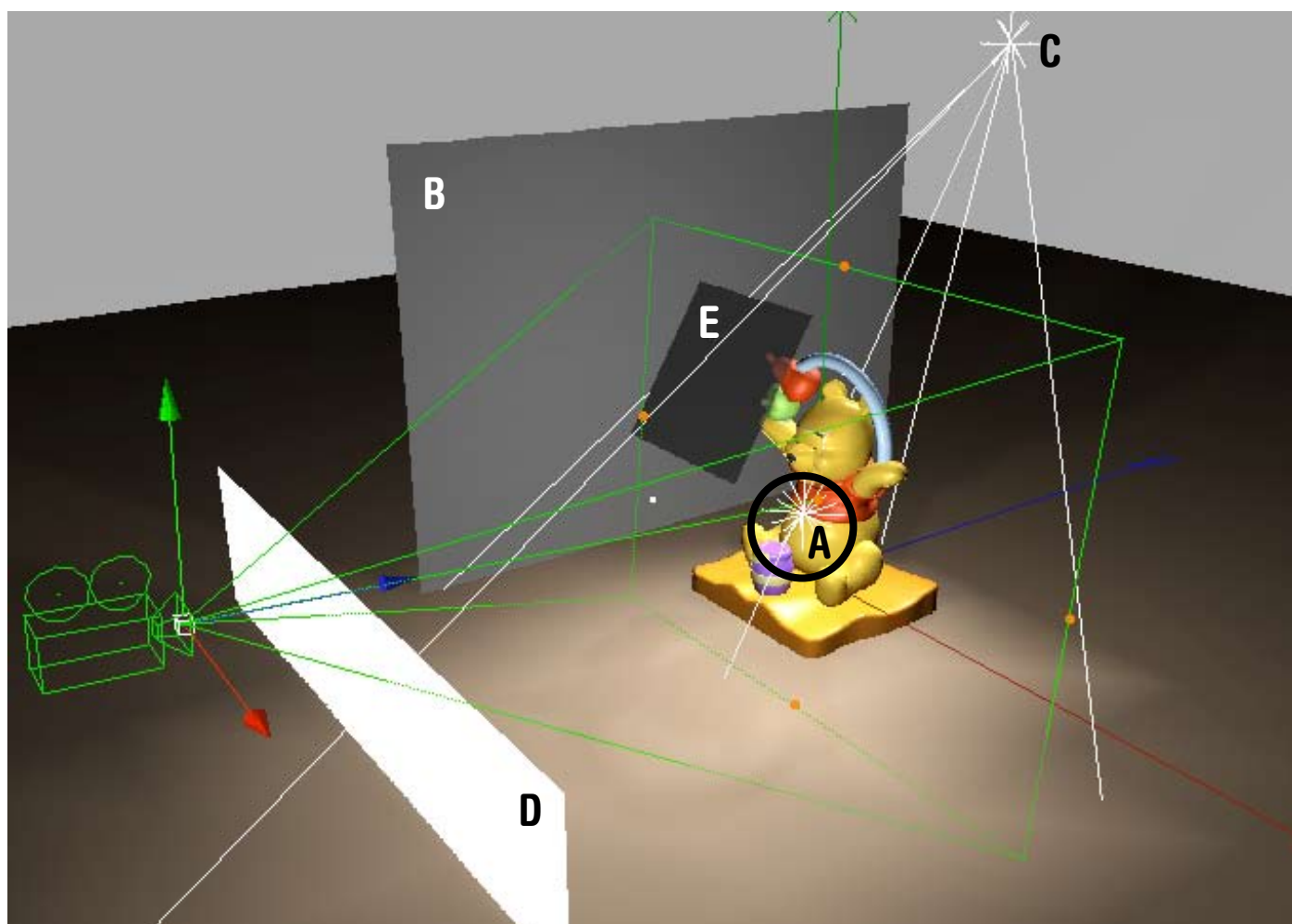
A fill light or a fill screen lightens dark parts of the image with an impression of ambient, reflected light, that seems to come from nowhere in particular.



This photograph by Chris Foresman of Iggy Pop beautifully illustrates what back light does: it makes a distinction between the object and its background by casting a rim of light onto the contours of the object.

In many ways, the back light is an artistic light. It isn't absolutely necessary when used in combination with a main light and a fill light because these two already give all the photons you need to see something. However, back light does give that much more visual richness that in quality lighting it is often a must.

3-point lighting in 3D



In the past couple of years, 3D has developed to a medium that in many cases can replace photography completely. What an invention! When it is impossible to get the object your into a film- or photo-studio or make it behave the way you want or when the object simply doesn't exist in real life, 3D is the solution. Or, which is also one of the special virtues of 3D: when the object has to look really clean. There is a lot going for realism in 3D. So, in the next of pages let's translate the classic three-point to 3D software.

In the studio at the top of the page, featuring Pooh Bear I've placed 2 lights and 3 reflection screens:

A, in the black circle near Pooh's belly is the main light. It is outside the scene (since we are parallel

with its direction we see it centered in the set)

B. is a reflection screen that reflects light from the main light onto the dark side of Pooh. I am using radiosity to make that possible. Without radiosity, the screen would reflect in the shiny plastic that Pooh is made of, but it wouldn't act as a light source. We'll get back to that shortly.

C. The back light.

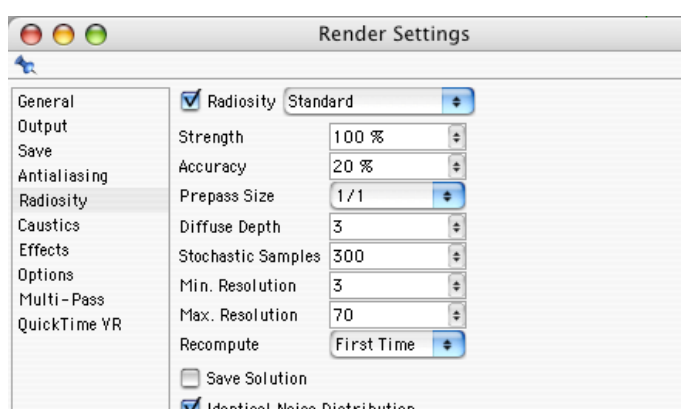
D. A second reflection screen, meant to cast some extra light on the full frontal view from which I shot Pooh.

E. An additional reflection screen to get some extra light on the fruit and onto Pooh's forehead.



1. I placed Pooh (but you can of course take your own object) on a floor and placed an omni light with 100% brightness and soft shadow at these coordinates:

Position		Size		Rotation	
X	100 m	X	0 m	H	0 °
Y	100 m	Y	0 m	P	0 °
Z	-100 m	Z	0 m	B	0 °
Object		Size		Apply	

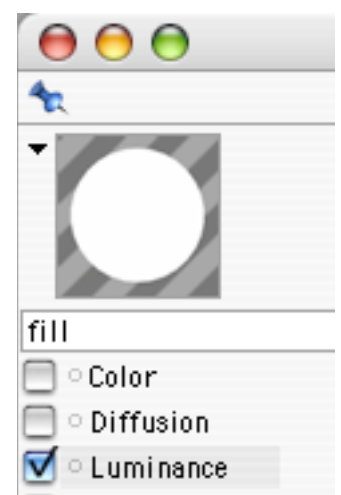


The image on the left was the result. Next, I turned on radiosity with the settings given (for a final render, turn up accuracy) and rendered again. The image above was the new result.

Note that the area around the honey pot is a little lighter and that there is some light reflecting from the fruit, shining onto the side of his head.

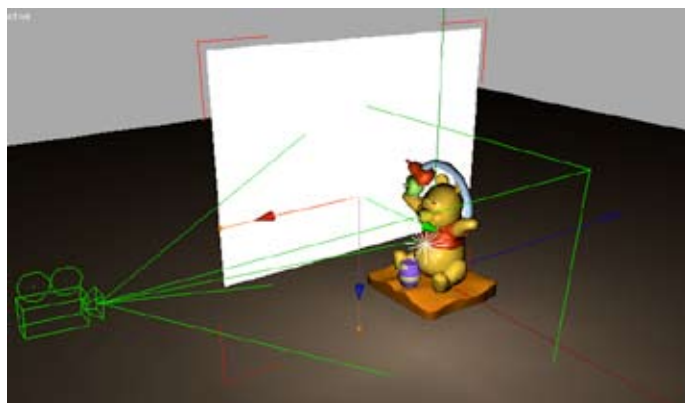
The overall direction for the omni light seems OK. Time to set up a fill light. Like said before, the fill is coming from a reflection screen. In order for it to cast light, it needs to be well, light.

I made a material with 100% Luminance, like this:

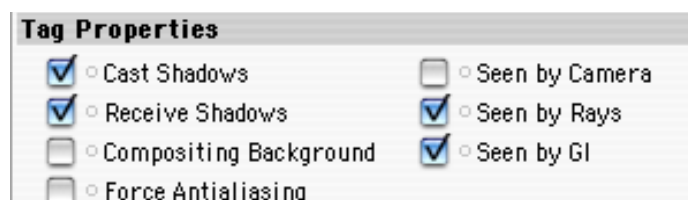


3-point lighting in 3D

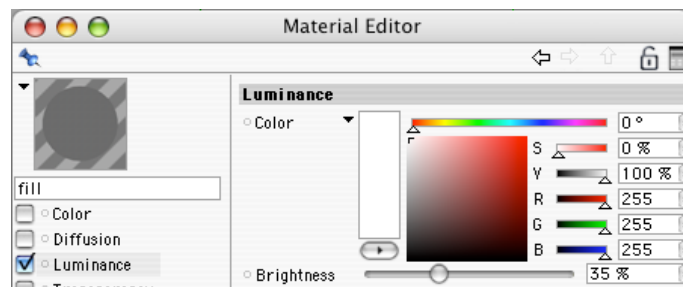
I put a plane next to Pooh, applied the Luminance material to it, turned to the camera and hit render:



The radiosity works fine but it has almost turned the reflection screen (with the main light casting light onto it) into a new main light: it's too bright. By the way, I hid the reflection screen from the renderer with a compositing tag with "Seen by Camera" turned off. Like this:



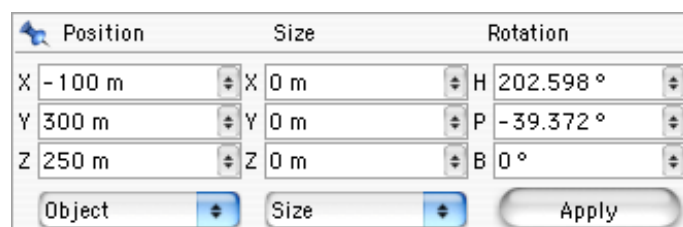
To control the brightness, I adjusted the amount of Luminance:



After some trial and error I set for one third of the original brightness (35%), which looks like this:

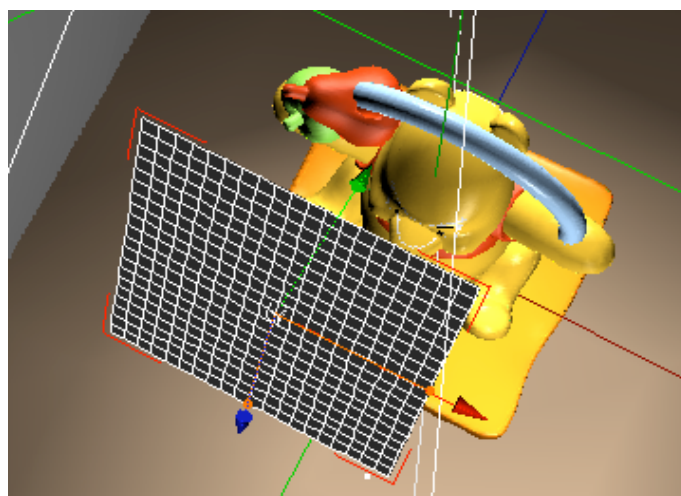


Time for the third classic element: The back light. I used a spotlight with 150% brightness (again after some trial and error. Every situation calls for something different), soft shadow and an angle of 45 degrees that I pointed at Poohs head:



The reason for using a real light and not a reflection screen for the back light is that a light will cast a shadow if you want it to but the light coming from a reflection screen can't, unless you render in radiosity's big brother HDRI. (see my tutorial on HDRI)

At this point I'm using soft shadows but often for a final render I often turn to area shadows. They're much slower to render but give a beautiful photo-like result, starting sharp at their base and then becoming blurred further on, like in nature.



Well, that doesn't look bad. Three things I'm not yet happy with are the honey jar, the front side of the thing he is sitting on and the left side of his head with the fruit. They're all a bit too dark. Because I'm content with the rest, I need to point a couple of reflection screens at just those areas. The first one is a simple plane with a Luminance material of 100% in front of him (see the complete set-up), that I again hide from the camera with a composting tag. The second screen is positioned like this:



That's it. The apple and the pear look much better and the honey jar has had just that little bit of attention. You might find that the shadows under his backside are a bit unnaturally saturated and orange. To tell you the truth: I like it that way. 3D is not just photography on the computer. It has its own behaviour and its own rules. And it should!