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Meet the new

V-RAY FOR SKETCHUP TEXTBOOK.



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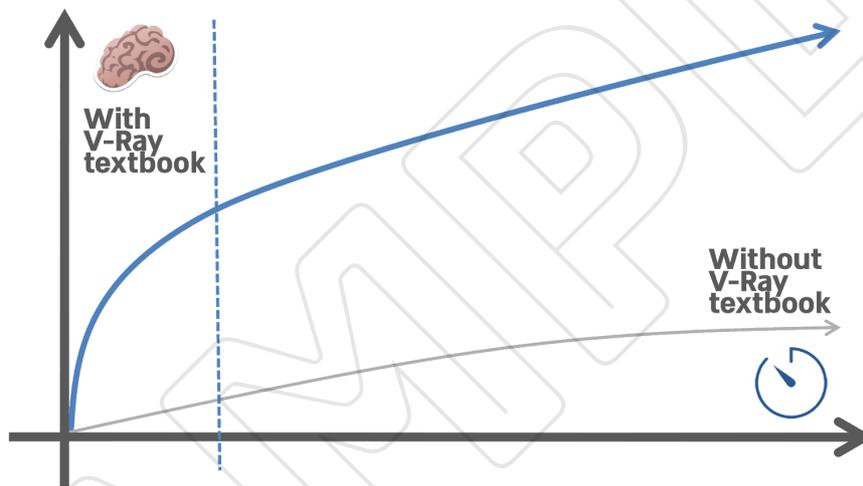
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Introduction

In this book, we're going to pace on two parallel paths: technical knowledge and artistic development.

Technical knowledge will allow us to better control the V-Ray for SketchUp toolset and settings, while also understanding certain real-world processes, such as photography optics and the physics of different materials. This is a fundamental and essential piece, however, since this style of learning is mostly technical, it's relatively easy to learn.

When it comes to artistic development, we'll focus on subjective topics, like the principles of photography and visual arts. Through this focus, we will offer techniques for emerging artists to develop their creative style, while also enhancing their design and criticism capabilities.



Quick and Efficient Knowledge Base

This is our graph for the immediate future. The graph shows two knowledge accumulation curves: One with the knowledge embedded in the V-Ray textbook for SketchUp and one without it.

The textbook's guiding principle is to minimize the V-Ray learning phase. Additionally, through this book, we'll learn about the most efficient rendering methodology within SketchUp in a relatively short period of time, while also maximizing the efficiency of the features that the new version offers.



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CHAOSGROUP

AUTHORIZED TRAINING CENTER

As part of the V-Ray ecosystem, I established the official V-Ray Training Center with my V-Ray team. This textbook was written by a V-Ray Licensed Instructor licensed by CHAOS GROUP and meets all requirements.

CHAOSGROUP

AUTHORIZED CERTIFICATION CENTER

Among other things, the Center serves as the Authorized Certification Center to train visual artists for a V-Ray Licensed Professional Certificate, through which an online exam and certification application can be submitted. Graduates of our course are eligible to take the qualification exam through Chaos Group.

In establishing the official training center, I passed the certification exam with honors. The exam tests for knowledge, experience, and technical skill, all of which we will use to solve issues in V-Ray for SketchUp.

Today, I am proud to serve as the head of the training as a qualified V-Ray Licensed instructor.

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SO WHAT'S ON THE MENU?

There's lots of material waiting for us in the V-Ray textbook for SketchUp!

The book is divided into several different knowledge sections that will enhance our overall knowledge of V-Ray rendering skills.

Chapter One: Get Started

We'll start at record speed, and will only increase our pace from there! By simply starting this book, we're taking a brave step, one that will lead us down a fascinating path that begins right now.

Chapter Two: Composition and Photography

First and foremost, we must slip on our photographer's hat. This will allow us to experience an intriguing journey through the world of photography, as observed through the V-Ray lens.

Chapter Three: Illuminate the Scene

Whether it's daylight, sunset, dusk, or just artificial lighting from indoor space, one of the main pillars of a photorealistic render is the space's lighting. It will always have a decisive influence on the final render.



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Chapter Four: Materials

By actually examining different objects, we can learn, specifically, about how the light works, the reflective properties of certain surfaces, and how everything works together. Through this study of materials, we can really learn how real-world physics and optics work.

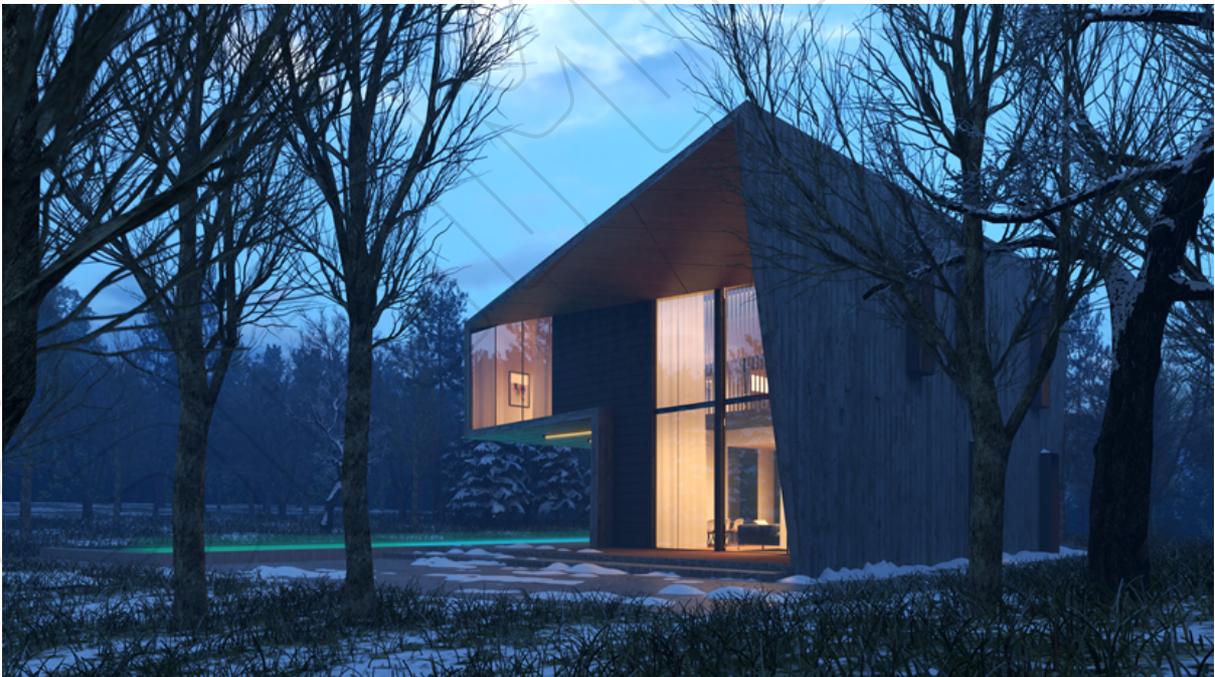
Chapter Five: Advanced Geometric Elements

In this chapter, we will take a look at some of the expert tools within V-Ray for SketchUp.

Chapter Six: Finalize and Post-Production

The final chapter will mainly touch on the photorealistic render production process phase. We'll try to answer any remaining questions in this chapter, while also shedding light on the post-render digital image processing process, also referred to as post-production.

Let's do this!



Forest Retreat by Moshe Shemesh

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It is advisable and super easy to just navigate the whole document using the search feature in Adobe PDF Reader.

Just hit Ctrl+F and search for any keyword!

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WELCOME TO THE WORLD OF V-RAY!

Before we get started, we need a few things



An up-to-date version of V-Ray. This can be downloaded from www.chaosgroup.com



A comfortable mouse with a scrolling wheel. This is a must! It will enable efficient navigation within a model.



A large, widescreen. (Maybe two or more LED 23-inch screens.) A 16:9 Ratio is recommended.

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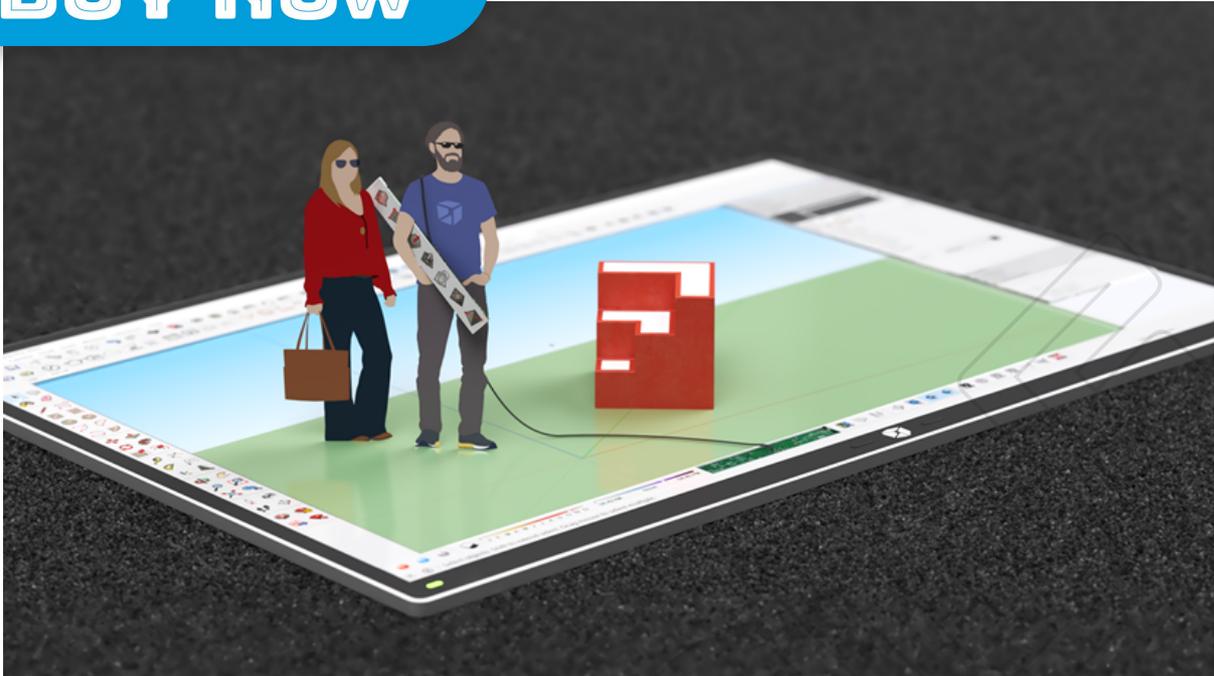
Ingredient

MOTIVATION IS ESSENTIAL!



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Download and Install V-Ray

Either install SketchUp or ensure that you have a version of SketchUp that supports V-Ray. The download and installation include a few simple steps:

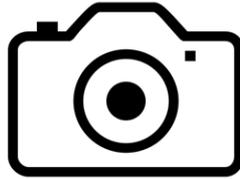
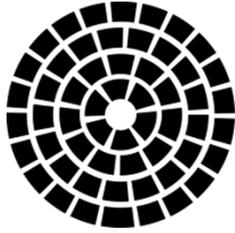
1. Go to Chaosgroup.com, then to the 'Downloads' area.
2. If you're an existing user, you'll be prompted to login. If not, create a new account.
3. Go to the 'Trials' section and start the trial version of V-Ray for SketchUp.
4. After the trial period starts, go back to the Downloads area, then download the latest compatible version of V-Ray as a trial.
5. Once you've successfully downloaded the version for SketchUp, save it to the computer in a known location. Click on the installation file and go through all the installation steps. The installation will also install additional software that is required to run this specific software.
6. After the installation process is successfully completed, you can launch SketchUp. The new V-Ray toolbar will appear immediately after it opens.

The trial version will be valid for 30 days after the installation date.

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Synchronizing these three elements will ensure a successfully balanced and realistic rendering.



Lighting is a decisive factor, as it affects the 3D scene's entire environment. Certain light reflections, color delivery, and scene visibility will all be directly influenced by the setting and, more specifically, how much natural and artificial global lighting is in the scene. How many times have you said to yourself: "Wow, what dramatic lighting!" But that's exactly it! In order to place lighting elements in a scene, we must understand real-world lighting, and we also need to be meticulous with our planning.

Both materials and texture mapping are very important elements when creating a photorealistic render. Each material has its own DNA, a set of different properties that emanate from the imitation of a given real-world material. Correct, accurate mapping, combined with the geometric object on which it is applied, will yield us a true, reliable understanding of the material we want to emulate from the real world.

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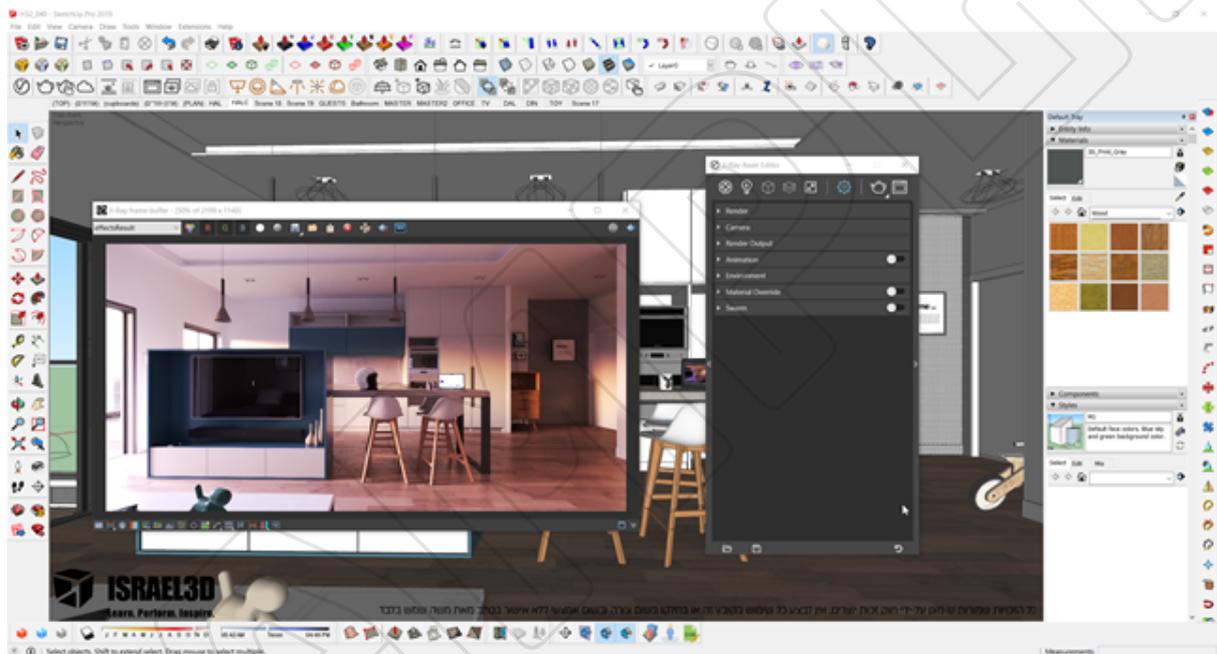
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SketchUp possesses a more interactive interface than what is built in SketchUp, meaning we don't need to use other software to render our model. With V-Ray for SketchUp, V-Ray is a plugin, which allows us to render away and get real-time results inside SketchUp.

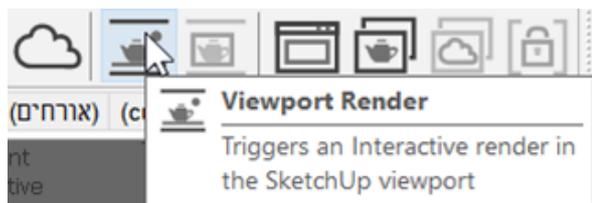
In the latest version, Chaos Group engineers have done an amazing job presenting a brand new interface. V-Ray now displays an all-in-one window with all the resources we need: settings, materials, lighting, special geometric elements and the V-Ray Frame Buffer. There's also a default menu, under the extensions menu and the right-click context tools.

In V-Ray for SketchUp, there are few toolbars that can be docked as much as any SketchUp toolbar.

This is how SketchUp looks when V-Ray is rendering interactive mode:



Tip: If we hover over any tool in SketchUp, we'll get quick information about it! We can use this feature in the beginning, and while attempting to memorize the tools we'll use in the rendering process.



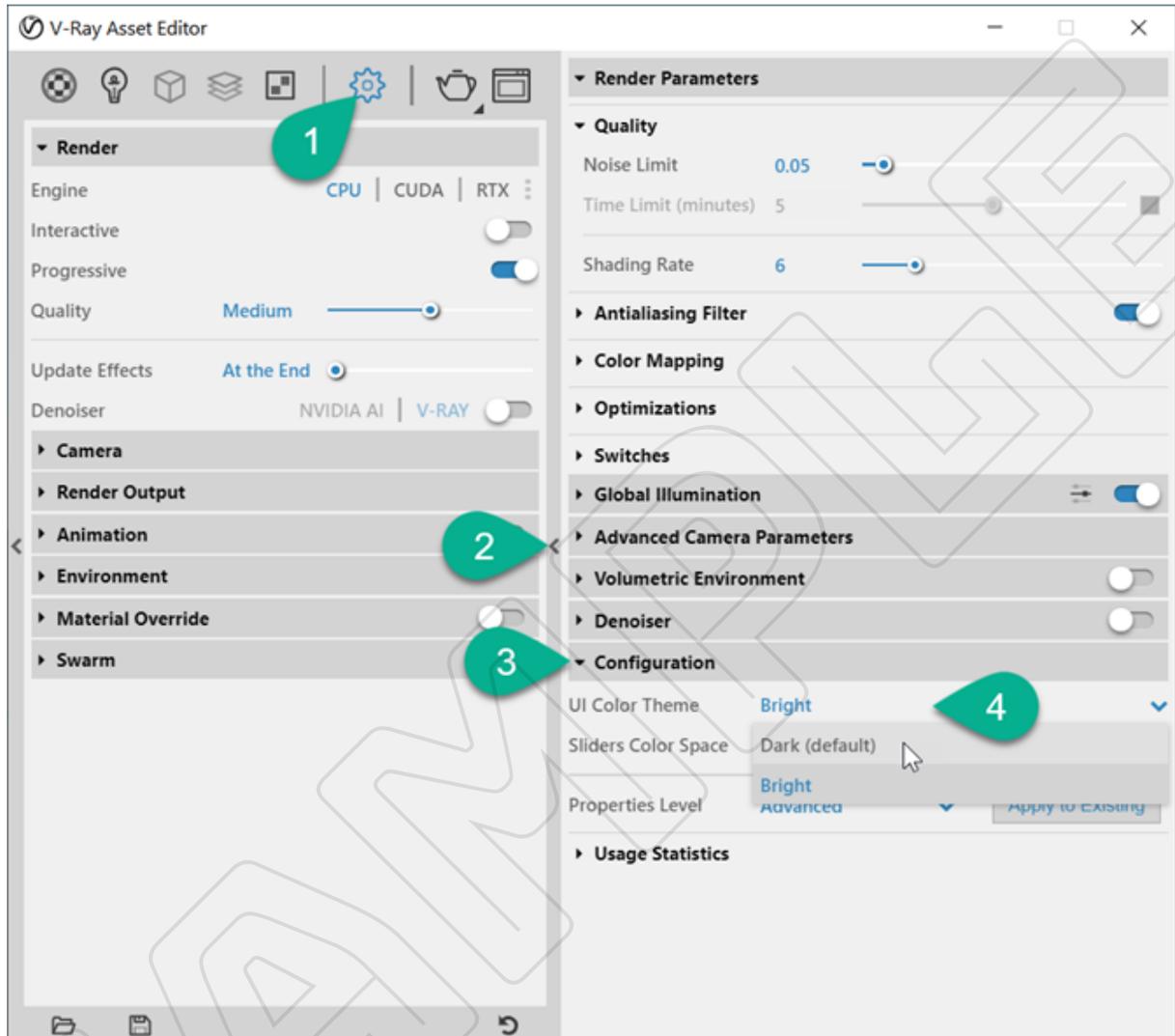
If we look at the new toolbars together, we can do a quick overview of the new commands and the new V-Ray interface. Currently, V-Ray consists of 4 different toolbars, each with different types of controllers. At first glance, we can probably guess what each

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Darkness

These days, most software allow the user the ability to change the color of the UI to a dark or bright color scheme. We can do this in the software menu below:



If you don't have access to this option, you need to download and install the latest version.

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V-Ray Render Engine(s)

Now let's get a bit technical. At the start of our last practice, I tried to answer this question: **Which render engine should we choose?** The answer is a bit inconclusive, however, in this lesson, I'll try to explain the essence of using different render engines according to our hardware installed on our machines (PC or Mac).

The V-Ray render engines derive their computing power from two components that commonly exist on our high-end computers: the central processor and the graphics card processor.

The central processor, or CPU, is installed on every computer. The other is the graphics processor or video card. As V-Ray users, we're considered to be very demanding hardware consumers. Therefore, computers designed for rendering, gaming, animation or video editing will often have a high-end standalone video card, complemented with high-end CPU and powerful RAM (memory).

It's important to remember that there are some machines that don't have a GPU installed. It's better to have one, but it isn't mandatory as the CPU.

So this is how it really looks in both the V-Ray UI and in real life:



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LET'S LEARN ABOUT RESOLUTION

We'll often find ourselves producing renders on a variety of different software.

The graphic output will be produced for different purposes, whether for web presentation or print, and the rules will stay the same, no matter which was the origin software.



Click Ctrl and "+" to zoom in the image above and seek for individual pixels.

With this information, we can adjust the render resolution for a specific purpose and enjoy an efficient render that fits that purpose. This way we can help define the final output of a render, and exactly how many pixels to use.

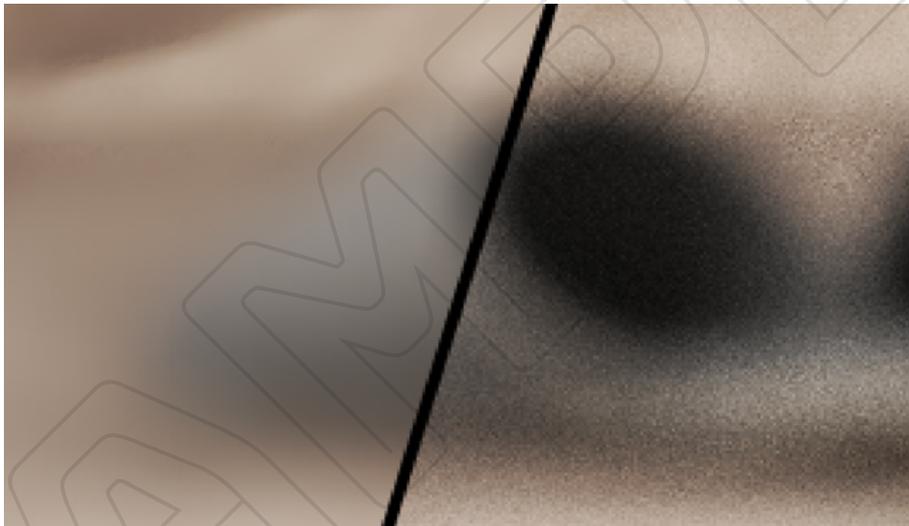
In this lesson we will know how to determine the render resolution based on the final product.

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In the following comparison, we can clearly see the differences, and the result, after noise-cleaning.



From this point of view, there aren't too many important or small details, making this a great example of a high-quality, noise-reduction operation. The clear differences between the two images mean that the denoiser has proven to be very effective, especially in areas with plain surfaces, which commonly exist in architectural spaces and interior visualizations.



Important Topic

V-Ray has to work 3-7 times harder (in terms of time expenditure) than it normally would for us to achieve the same noise-cancelling results that we get when using the denoiser.

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Disturbance between three basic concepts:



Perspective: This is the sense of depth in the image, or the depth perception, represented by how we notice differences with the distance in a 2D image. We'll also learn about depth of field.



Composition: This term refers to the way objects are organized in the image area, including what is included in the photograph and what gets left out, where the most important objects are placed, and so on.

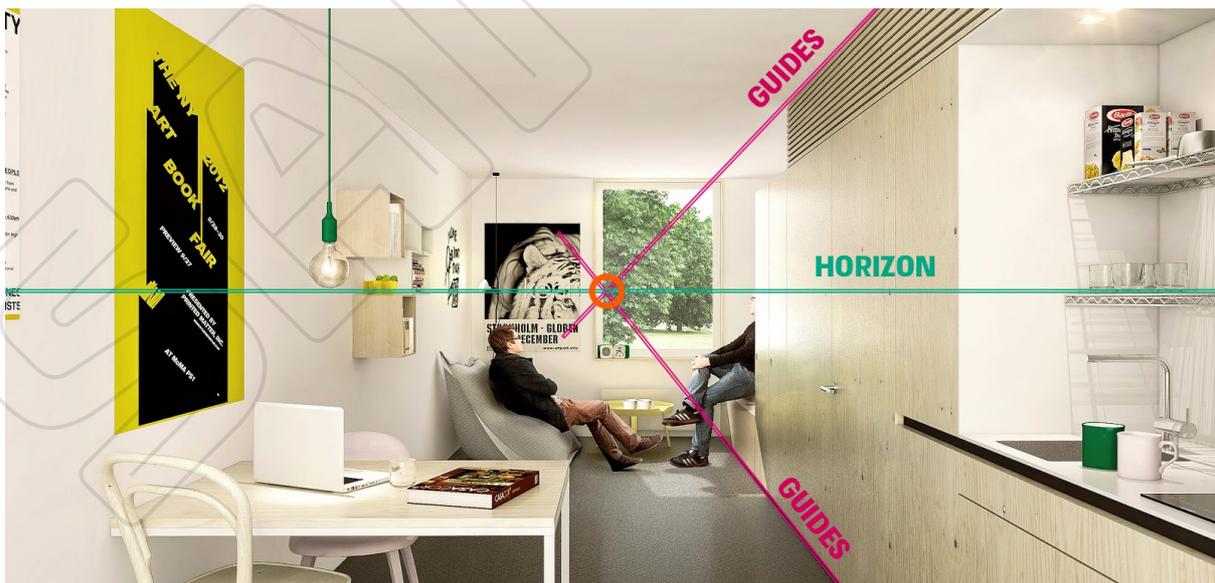
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perspective by the 3d artist David Brufau. **(Note: The left vanishing point disappears out of the frame, which is not necessarily a bad thing!)** Vanishing points reveal the height of the horizon line, which we will expand on later. In an architectural render, we mostly want to stick to Two Point Perspective. In Brufau's render, the vertical lines are parallel to the frame (the green lines marked Z).



We also need to take a look at an interior render with a single-vanishing perspective. The single vanishing point here is at the center of the composition. In this image, the perspective is maintained, as all the vertical lines (Z) are parallel to the frame:



Artwork by David Brufau / dBrenders

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decided to leave the TV and window material, to add

Here is another example of a clay render, where we excluded several materials (the top image has been captured before excluding them):



Without Override Materials:



Gray Override Material Color (227,227,227 = RGB) on everything in the model except the glass and window materials.

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One of the most spectacular visualization methods is a twilight shooting method. With it, we can produce the sunset at dusk, with a still-dim and bluish environment and artificial light emerging from the interior space. In this type of light strategy, we'd try to seek for a suitable HDRI lighting and proper V-Ray lighting and lighting fixtures.

The above example combines evening light conditions, through a combination of low lit HDRI illumination combines artificial lighting fixtures in the streetlights and the inside of the building.

Sub-Chapter

ARTIFICIAL LIGHTING

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Final Exercise of Artificial Lighting Chapter

At this point, we've reviewed each lighting element and their unique characteristics in our models, so the only thing left to do is practice using all of our lighting elements.

The above example contains a kitchen scene and a small dining area, which offers plenty of opportunities for us to design with light. We already know that each lighting element brings its own kind of illumination, creating a pleasant atmosphere in our scene. Point lighting illuminates a specific spot, creating a sharper, more precise shade. Surface lighting, on the other hand, delicately illuminates and blurs our space, creating blurred shadows.

This example displays a balance between the photographic value ($EV = 8$) and the other lighting intensities and shades. Feel free to use different lighting shades with each body, to demonstrate diversity.

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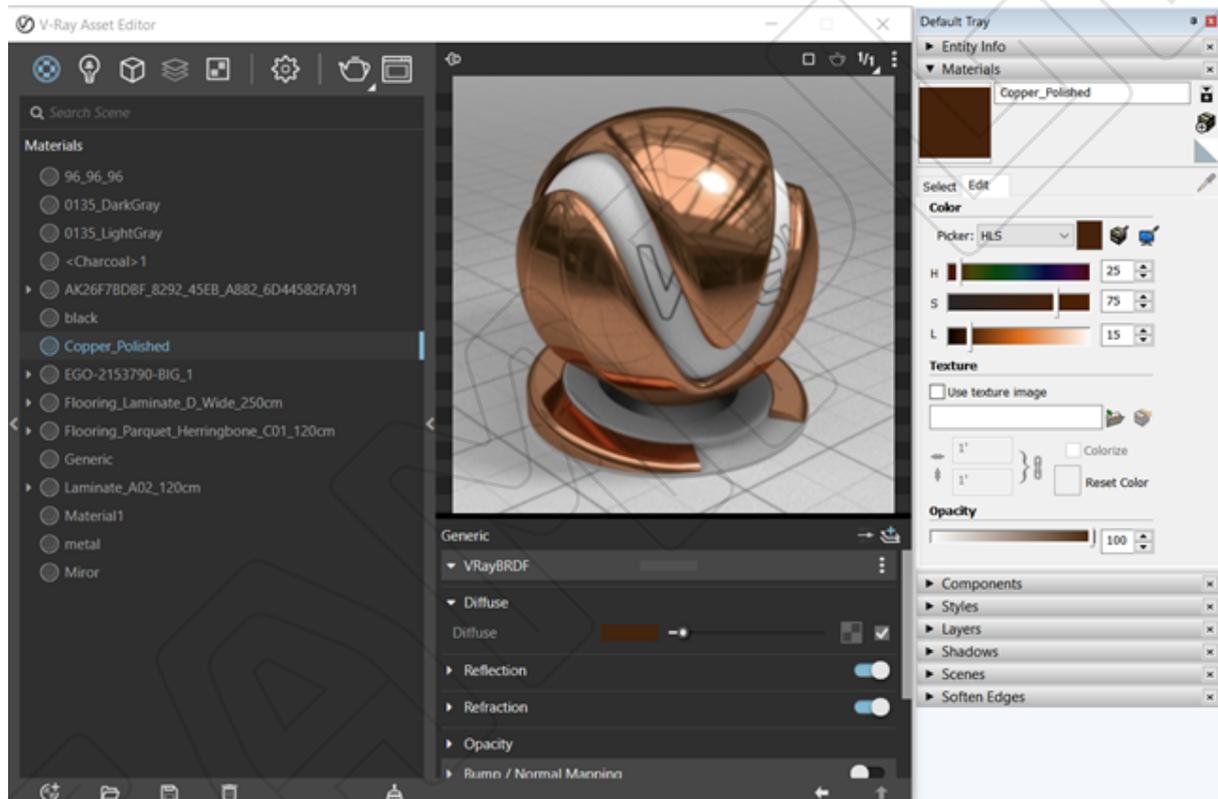
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We've already learned at the beginning about the three core elements of a successful render: lighting, photography and **materials**.

Implementing materials with high quality settings is particularly important as well as the mapping of such materials onto the geometry. In SketchUp, we can apply and map materials, however, there are some limitations, which is why we also use V-Ray.

In this chapter, we'll check some of SketchUp's features and how V-Ray can significantly upgrade SketchUp's elementary materials properties.

Let's start with a SketchUp - V-Ray comparison



The above screenshot is of the SketchUp UI material window, displaying the simple interface, with no advanced features and realistic material features whatsoever. In the expanded V-Ray material window, we can see the list of materials in our scene. (We can expand the window by clicking the arrow in the center of the window. Will then be able to see more details about the selected material.)

The difference between SketchUp and V-Ray is similar to the difference between an illustration and reality. With V-Ray's material interface, we are able to create a realistic imitation of real world reality with a lot of possibilities. V-Ray can calculate light and

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Plugin Recommendation

Round Corners

We know by now how important our painted (with texture, shade or complex V-Ray material) geometric element is.

Now, I'm going to introduce an important plug-in, meet - round corners. This plug-in was created by the almighty Fredo.

But why is it even important to round these corners? Obviously, we want to round all the geometric corners. Allow me to explain: Look around, at keyboard keys, at the round corners of the keys from up close, the round corners of the screen. See it? There are so many rounded corners in the real world and, except for a razor-sharp knife, there are really no sharp corners at all! Everything around us is circular, or rounded.

Taking this into consideration, when we design orthogonal boxes in SketchUp, we always want to **round the corners, ensuring minimal separation** before our final render. By rounding the corners, we get a realistic-looking image, successfully imitating real-world elements. Now for the demos and graphics.



Exercise

We can find the Geometry Importance_Round Corners model in the Chapter 4 practice folder.

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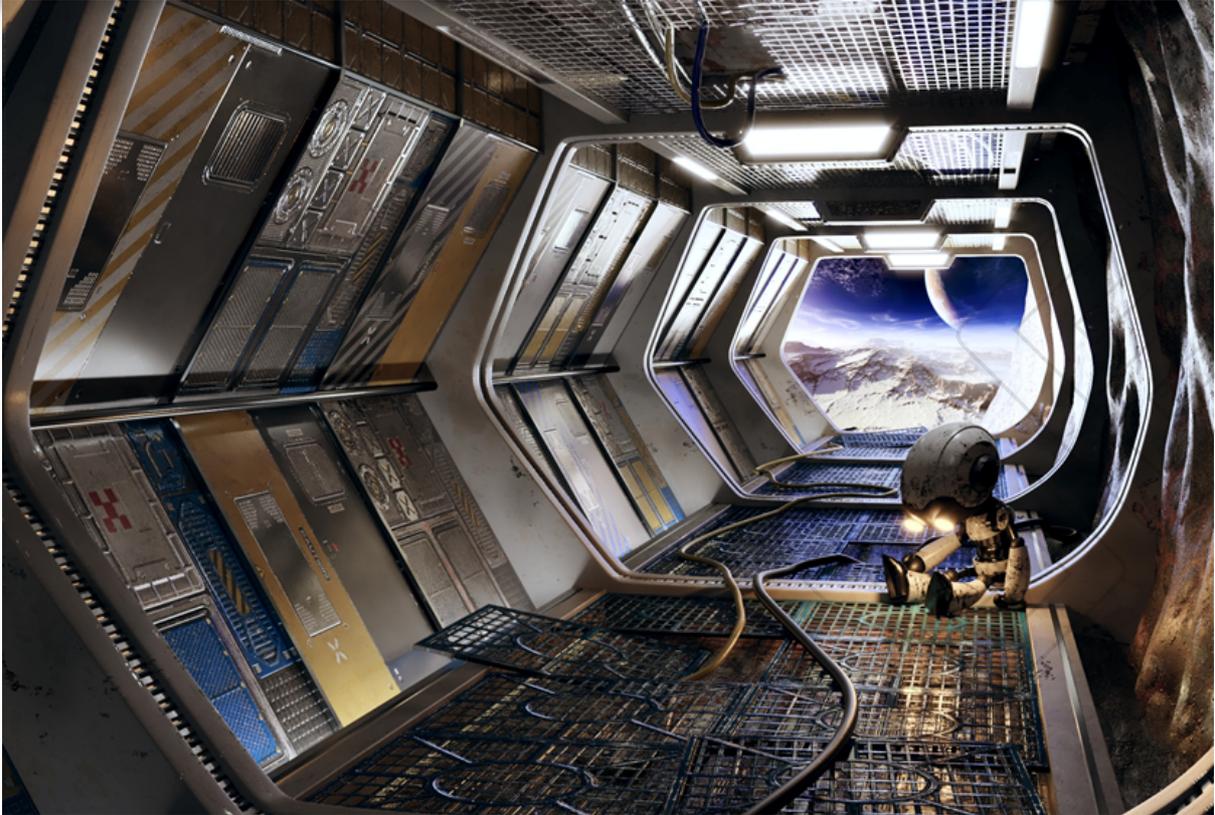


Illustration: 3d artist Shlomi Laufer, 1st winner @ 3D Sci Fi Challenge

Chapter Five

ADVANCED GEOMETRIC ELEMENTS

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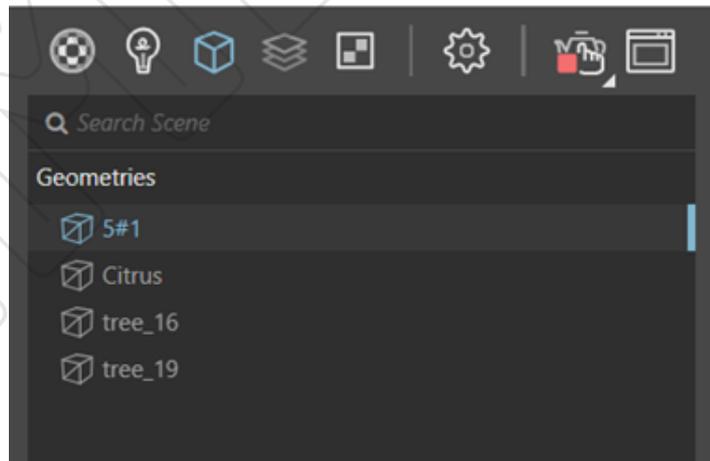
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After we've placed all the trees, we can see a composite list of all the imported elements, in the geometry tab in the V-Ray Resource window.

At this point we should name each of them, to differentiate between them (for example, differentiating between a tree and a bush).

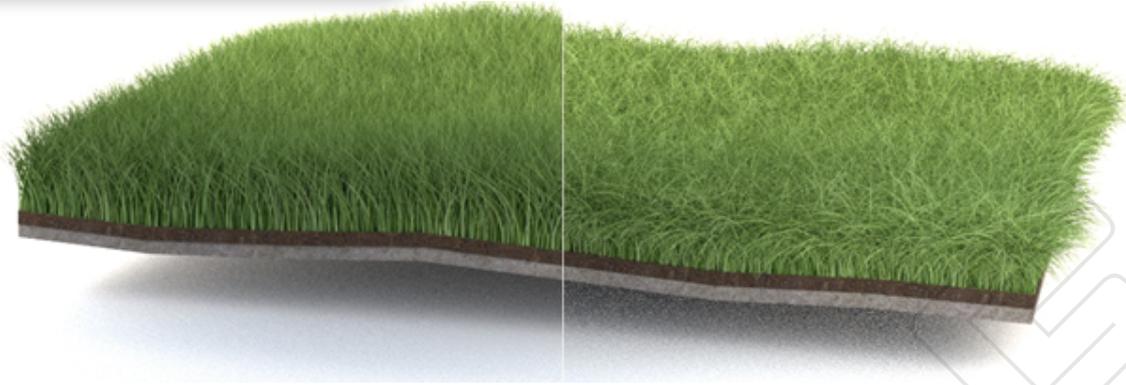
✓ V-Ray Asset Editor



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V-Ray Fur?



Length = 30

Gravity = 5

A lawn that has been walked on a bit

Length = 30

Gravity = 1

A more naturally looking lawn



The iconic look: noodle-shaped grass

Length = 50

Thickness = 0.5

Gravity = 1

Bend = 0.2 (fur curl)

clicker = 0.1 (starts thick and ends thick,
looking like a noodle)

Distribution → Per Area = 0.05

A field with tall, hard grass

Length = 50

Thickness = 0.5

Gravity = 1

Bend = 0.2 (fur curl)

clicker = 0.9 (starts thick ends sharp)

Distribution → Per Area = 0.05

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Artwork by Piotr Zieliński

Chapter Six

POST- PRODUCTION

In this final chapter, we'll learn about our photorealistic render post-production process phase. At this point, we already know how to paint elements, illuminate scenes, choose compositions and take amazing photos!

But what do we do after creating our image? What do professional photographers do?

We'll try to answer these questions throughout this last chapter, while shedding light on the process of the 2d digital image processing.

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Background in a Render

While creating our render, we aspire to create an imitation of the real world.

One of the crucial elements of a render's composition is its background, often viewed from the horizon, or through a window or opening. A render's background directly affects its environment, as it can determine the render's ultimate background space, so it's very important to pick a suitable background image. (We can also choose to keep the HDRI image that covers the whole scene with light and background.)

Remember the lesson where we used adaptive dome light to illuminate a model? We incorporated an HDRI image, and saw how when we illuminated the model with a sphere, the sphere appeared in the background creating an holistic image.

If we want to place a background that will be reflected through the openings in an interior scene for example, we can use a painted curved wall, and positioning it according to the horizon line and its projected height is the easiest, most common method.

For example: If we take a picture of a high-rise apartment in Manhattan, we'll be able to see a few things through the window, including the roofs of several other buildings, different skyscrapers and the ocean (the horizon).



An example of placing a slightly burnt background image that matches the general render's color scheme and perspective. Render by David Brufau / dBRedner;

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Volumetric Effects

V-Ray's Volumetric Environment Settings

In the real world, we often witness changes in the climate around us, especially in the early morning, late afternoon, at winter times, or at the peak of a high mountain. Light rays pass through particles in the air, and the more compressed the particles are, the less visible the horizon.

The photo above is a photo of a coastline, taken from an airplane shortly after take-off. But the really interesting part of this picture is the **atmospheric effect**. The more we look away from the point the photo was taken, the more we'll be looking through particles in the air, which ultimately will disappear as white horizon. (Note: This isn't fog, it's an atmospheric layer.)

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Chapter Seven

CONCLUSION

Now that we've learned everything that was in my eyes important to learn (and there's always so much more!), we can summarize.

So let's learn about some final stuff that we usually do when we reach the final stages of our rendering project.

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Export and Import a V-Ray Settings File

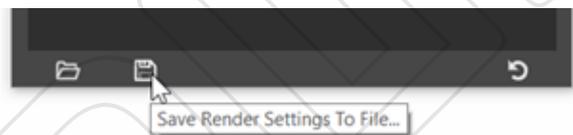
We've gone through lots of different steps to properly set up a scene, practice the render settings, the physical camera settings, output, special effects, and toggle lots of other settings.

V-Ray allows us to save a snapshot of our configuration with a file that we can either save somewhere on our computer or share with a friend. Ok, we are done with setting and configuring our scene. Now what?

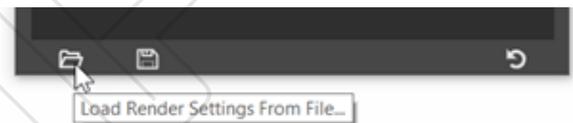
How can we export a file and then import it?

At the bottom of the settings window, we can see the save, load and reset buttons.

Click the save button to export the VROPT file.



The button next to it will load the VRPT file.



Once we've loaded the file, all menus and parameters will change accordingly.

The reset button returns us to the default settings.



(This button is very useful if we get lost in complex settings that don't really make a difference in our render.)

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