

The logo features a dark, circular emblem with a crown-like top. Inside the circle, the text "RADEON PRO" is written in a small, white, sans-serif font, and "Software" is written in a larger, white, sans-serif font below it. The background of the top section of the page is a dark blue, abstract, leaf-like pattern.

RADEON PRO  
Software

# Radeon ProRender plug-in for Blender

**User Guide v2.4**

This document is a user and set up guide with tips and tricks on how render photorealistic images in real-time, set materials and lighting.

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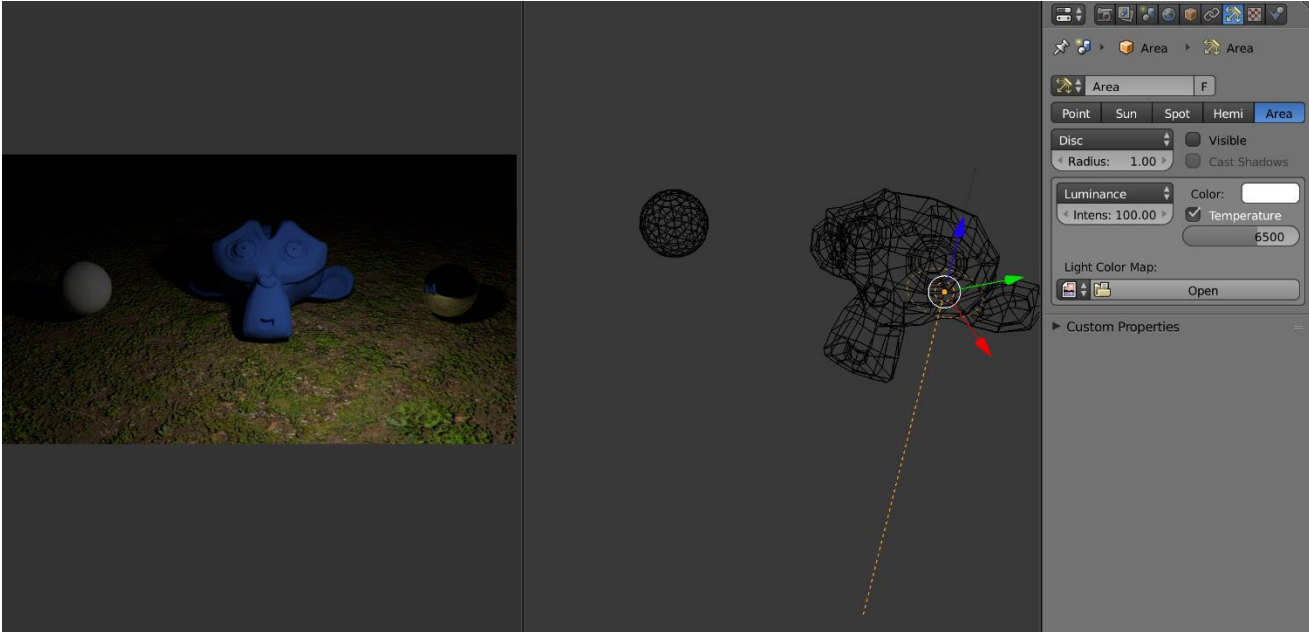
# OVERVIEW

Radeon™ ProRender is a free rendering plug-in for your design and animation needs in Blender™. Using accurate ray-tracing technology, Radeon ProRender can produce stunning photorealistic images and animations of your scene while providing real-time interactive rendering and continuous effects adjustments to create the perfect rendered image. Supporting real-time changes to the scene, Radeon ProRender allows you to preview the changes you have applied to the object in the viewport before the final render.

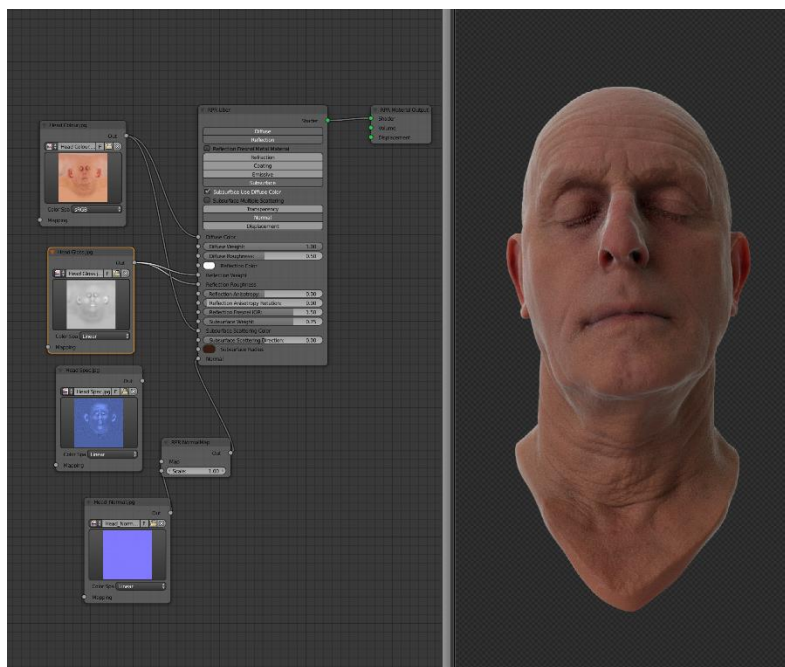
This user manual will describe how to use and set up Radeon ProRender for Blender from the install to the final save of the rendered image. This guide will also explain the additional features such as post render image adjustments, applying materials from Radeon ProRender Material Library and how to incorporate Radeon ProRender into your design workflow.

# What's New in Radeon ProRender for Blender v1.6

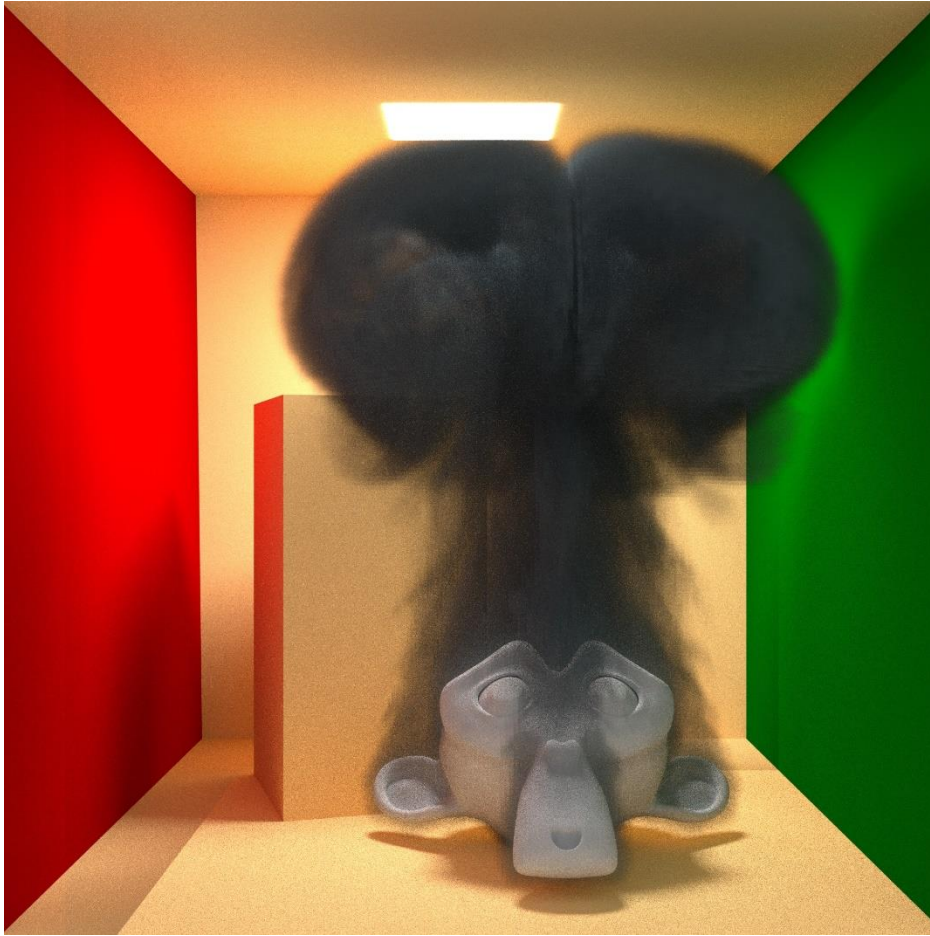
**Physically based lighting controls** – Lights can be set to the value and units of real world lights for accurately matching physical properties.



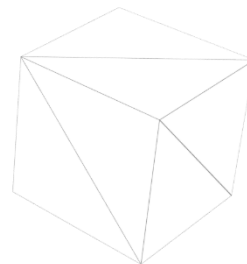
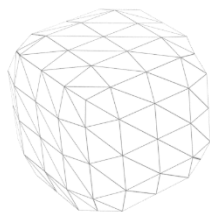
**Easier Subsurface Scattering in shaders.**



**Volumes** – Smoke created in Blender can now be rendered.



**Adaptive subdivision** – A new subdivision mode which will calculate how fine to subdivide objects based on their size in the render.



# Supported Platforms

Radeon ProRender for Blender v1.6 runs on both GPUs and CPUS. OpenCL™ 1.2 is required for GPUs.

## Software

- Blender™ 2.78+

## Operating System

- Microsoft Windows® 7 (64-bit)
- Microsoft Windows® 10 (64-bit)
- Ubuntu® 16.04.3
- macOS® High Sierra 10.13.3+

## Join the Discussion

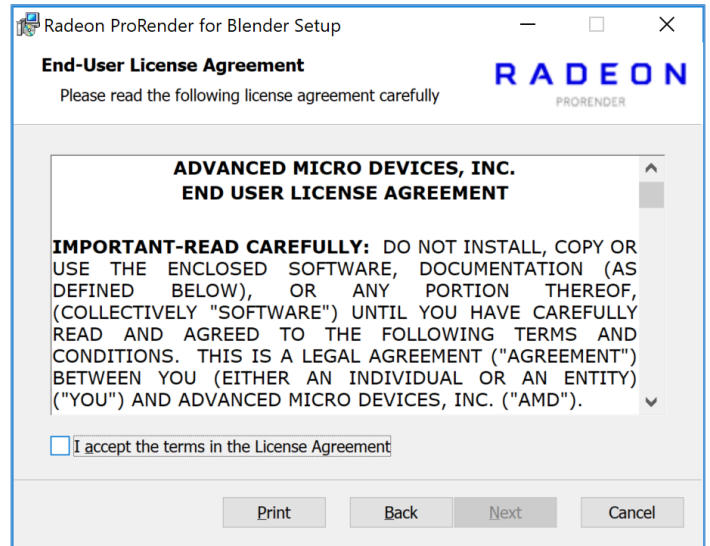
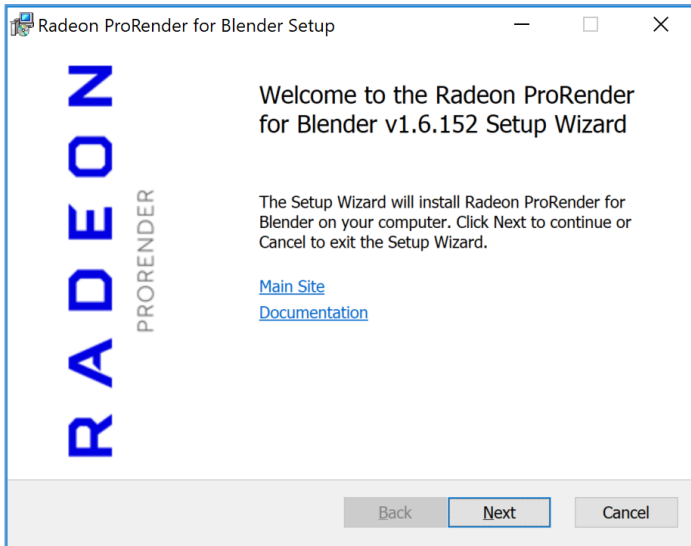
Provide feedback [here](#) for all Radeon ProRender plug-ins.



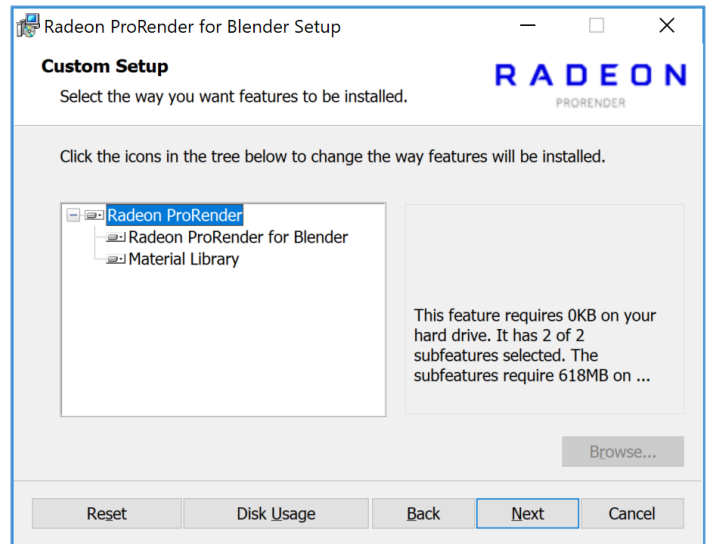
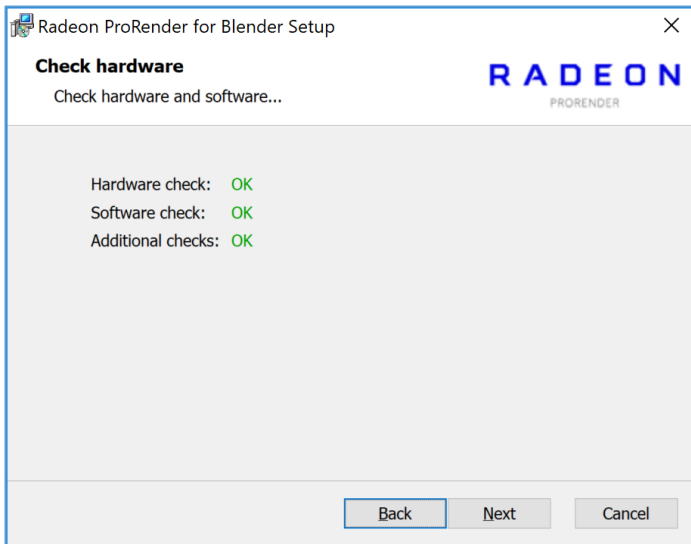
# Install Radeon ProRender plug-in

## Radeon ProRender for Microsoft Windows

Download the Radeon ProRender plug-in for Blender on Microsoft Windows®, and launch the installer and agreeing to the license.

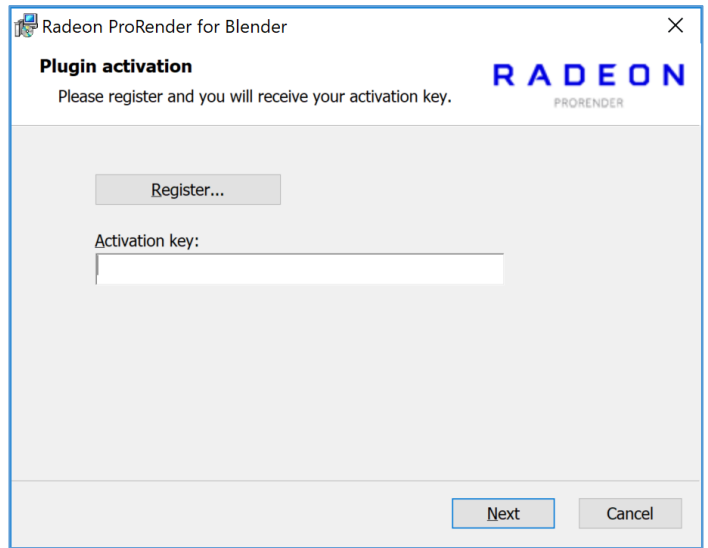
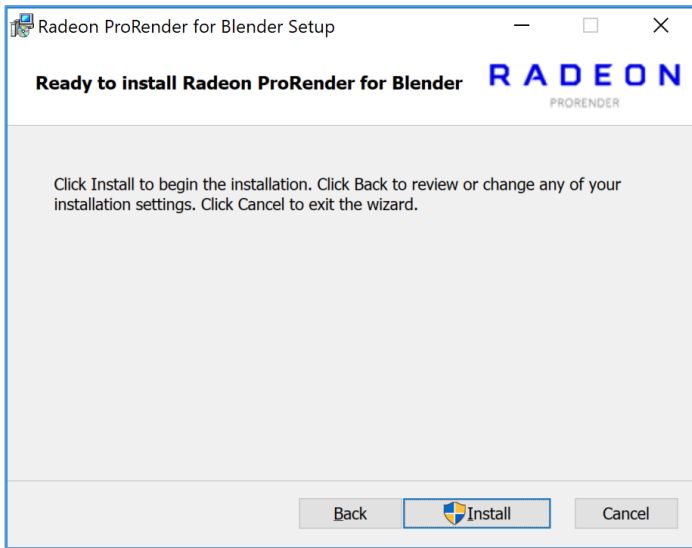


Radeon ProRender will check your hardware and software to ensure requirements, before letting you select your installer settings.

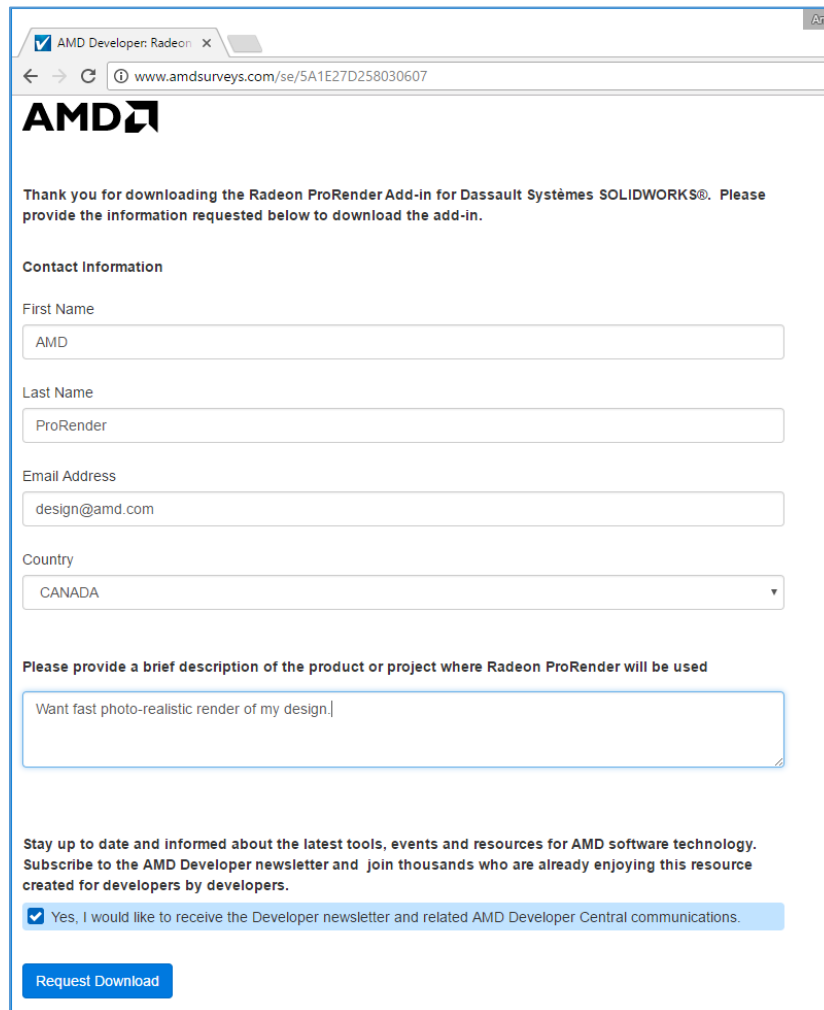


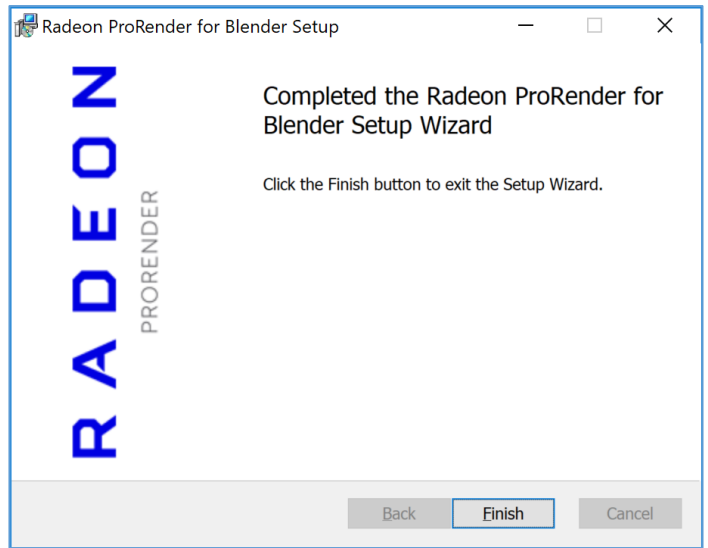
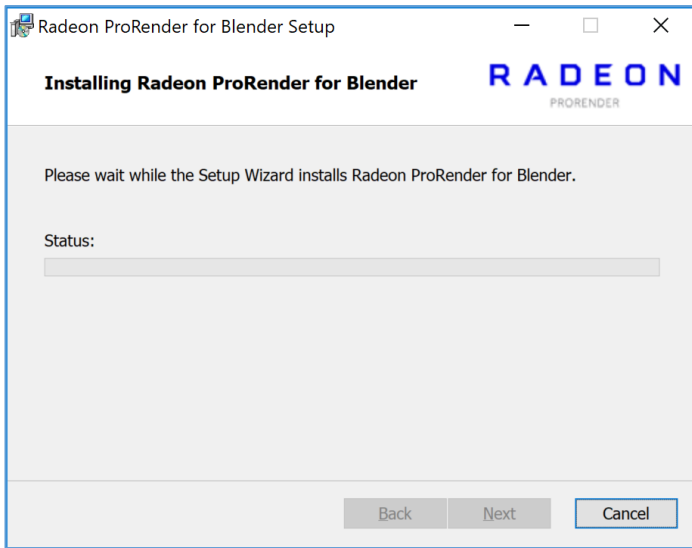
**Note:** Not all hardware has been whitelisted yet. Should Radeon ProRender not pass the hardware check, it will give an error message. You can halt the installation or continue at your own risk. On a failed hardware check, especially on your GPU, Radeon ProRender will default to CPU rendering when you start the plugin in Blender.

Click the Register button – it will take you to an AMD website to obtain an activation key by registering.



Register using your information. You will receive your activation key after clicking Request Download. Enter it into the installer and continue the installation.





## Radeon ProRender for Ubuntu

1. Download and install the amdgpu or amdgpu-pro driver and include OpenCL™.

Show help options: `./amdgpu-install -h`

There should be an option for `--opencl` that needs to be used.

For example: `./amdgpu-install -y --opencl=legacy,rocm`

2. If the non-pro driver was installed then run the following:

```
sudo apt install libgl1-amdgpu-mesa-dev
sudo ldconfig
```

The pro driver already executes this and the `sudo ldconfig` command is required.

3. Install the Blender addon

```
./RadeonProRenderForBlender.1.6.run $absolutePathToBlender # such as
~/Downloads/blender-2.78c-linux-glibc219-x86_64
```

Follow prompts to register and enter the registration key. A link is provided in the terminal with a web page that will provide the key. Finally, accept the EULA.

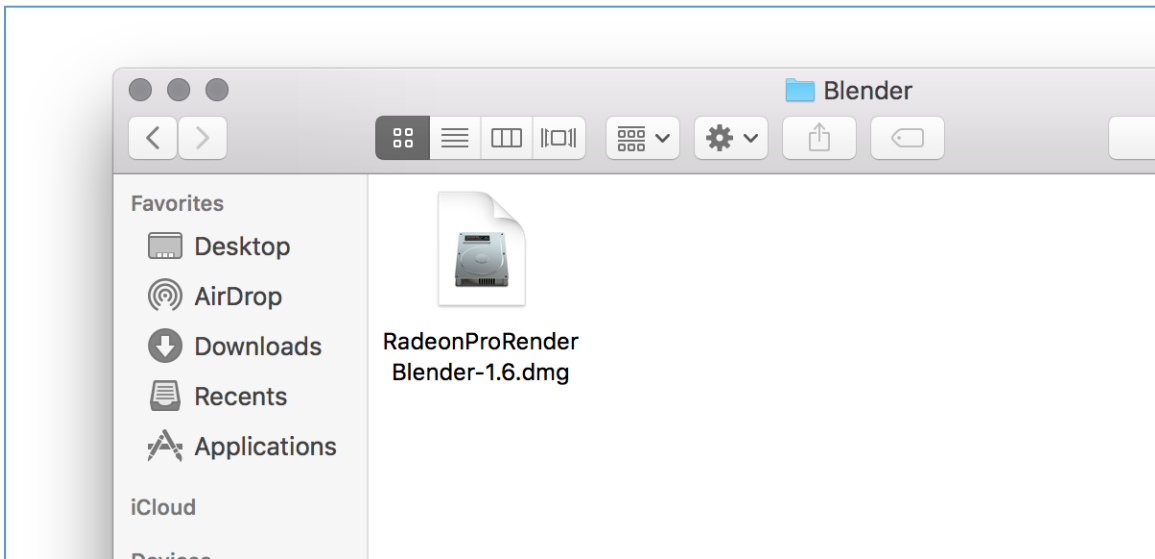
When running the installer, you will be prompted to enter the root password from `sudo` so that the required libraries are installed.



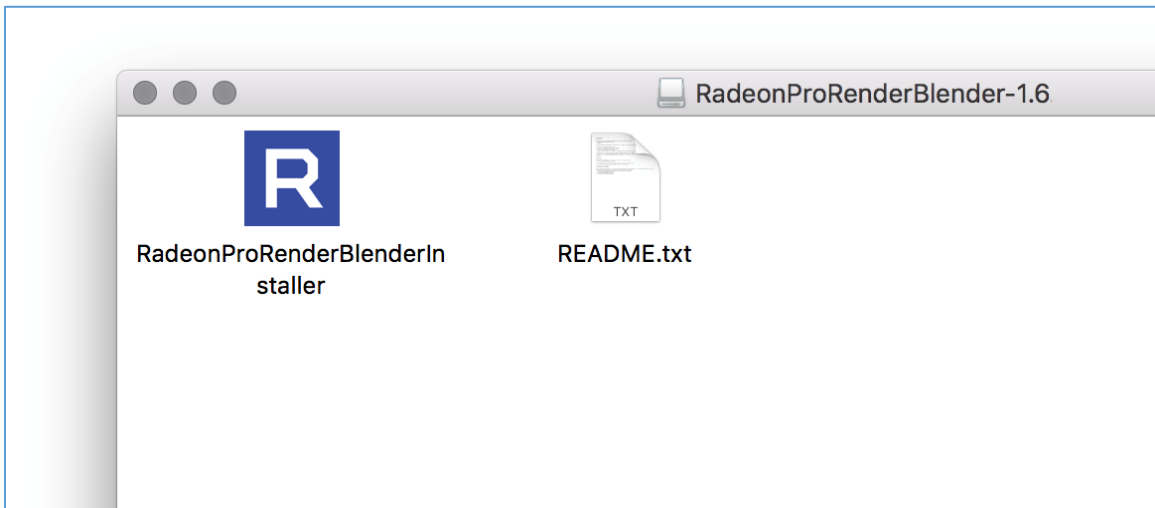
**Note:** The installer requires the path to Blender so that the Radeon ProRender plug-in is autoloaded and available when Blender runs.

## Radeon ProRender for macOS

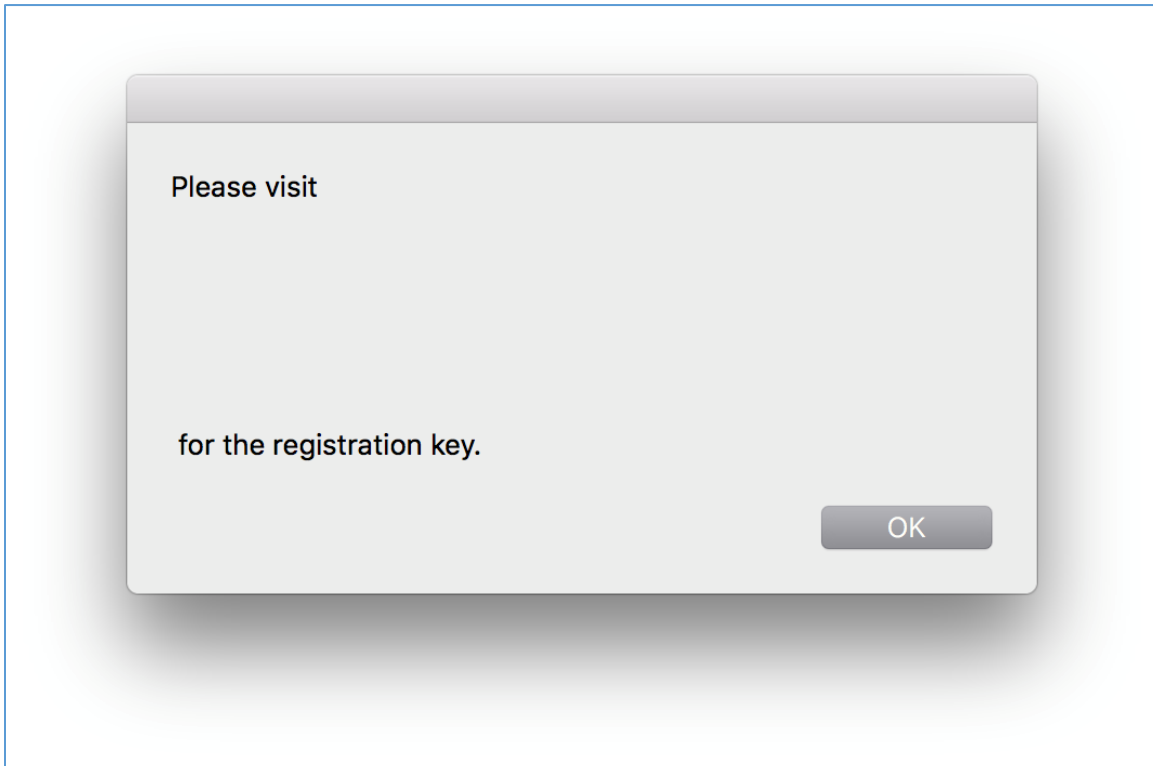
Download **ProRenderForBlender-XX.dmg**. Click to open.



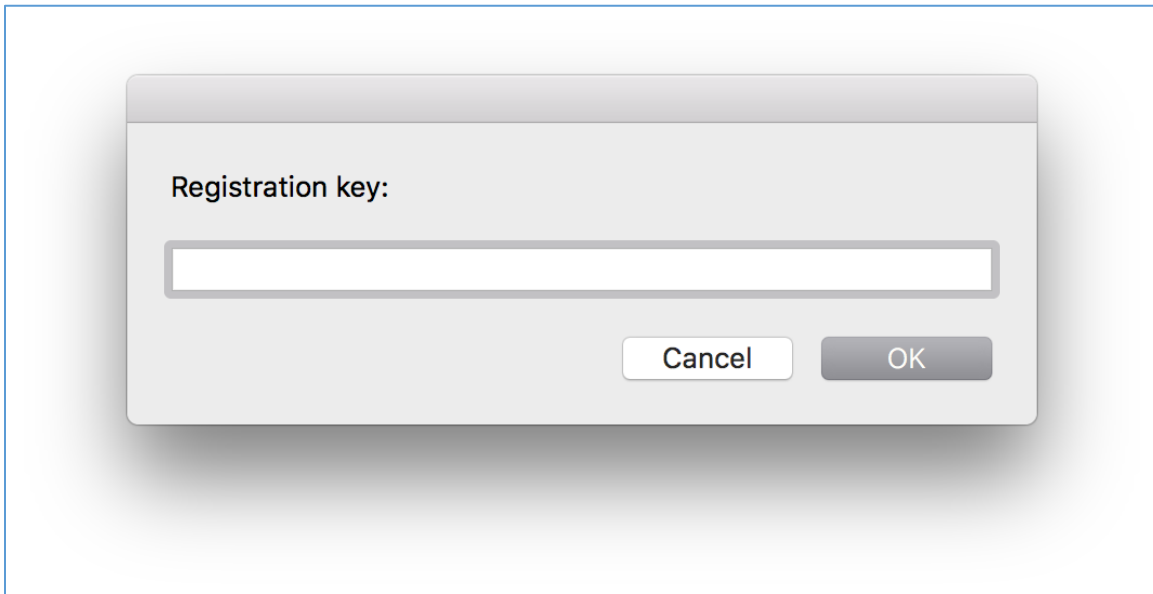
Open the **RadeonProRenderBlenderInstaller**.



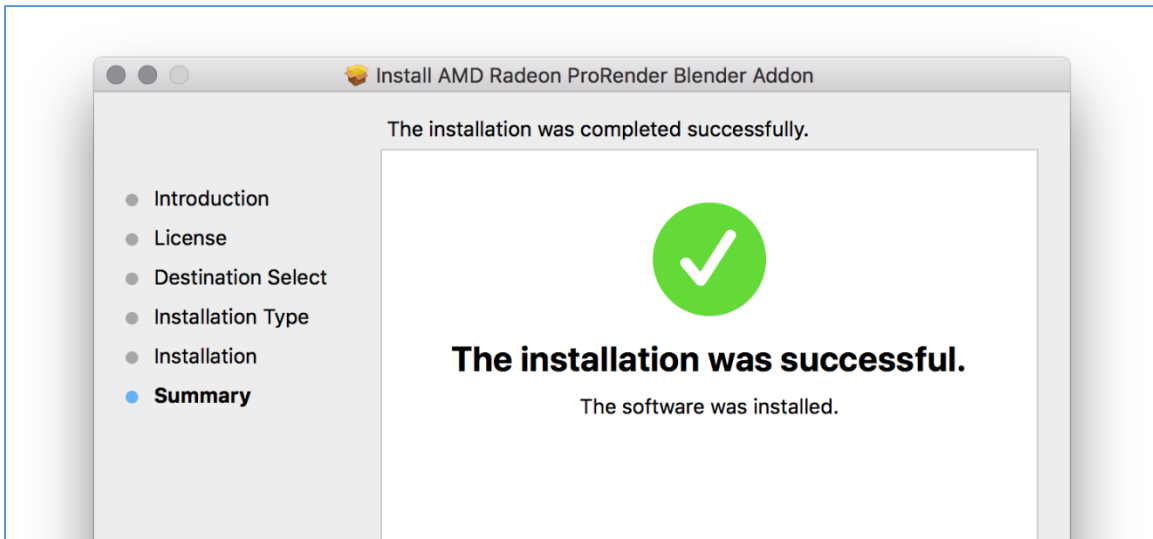
Copy and paste the website into browser to obtain the registration key.



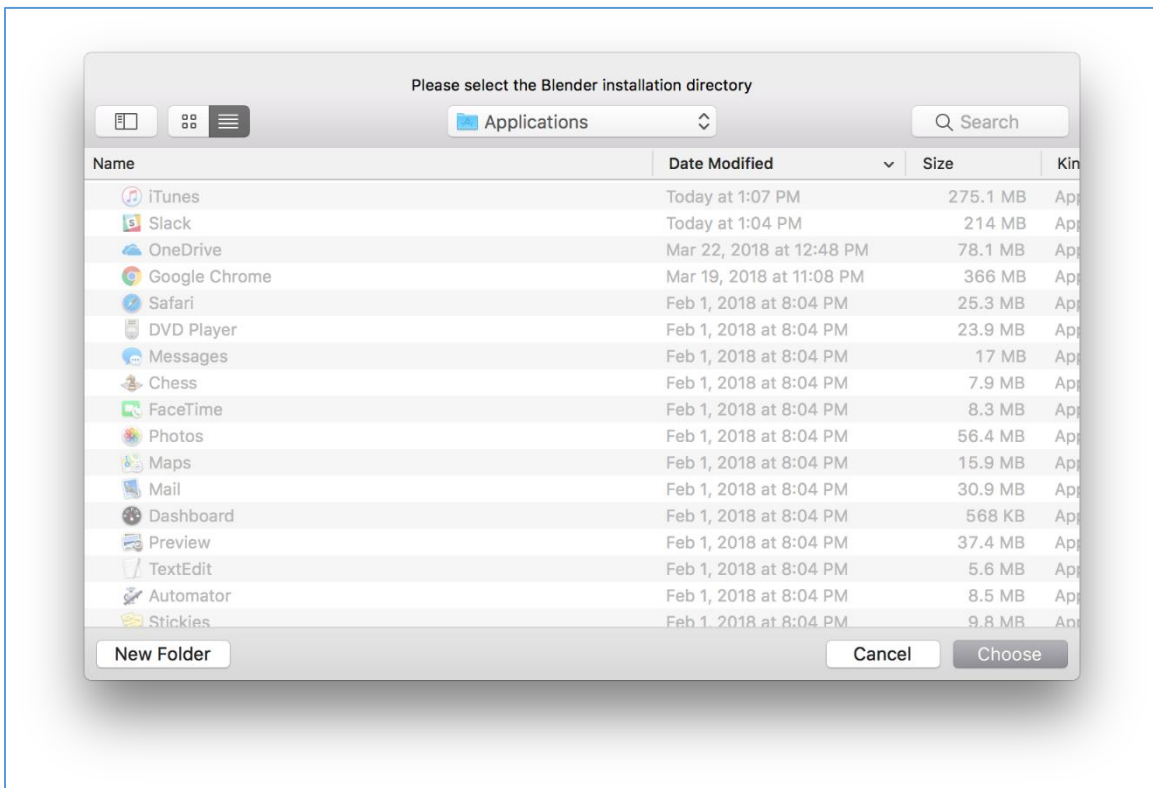
Enter the registration key that will be emailed to you.



Continue through the installation

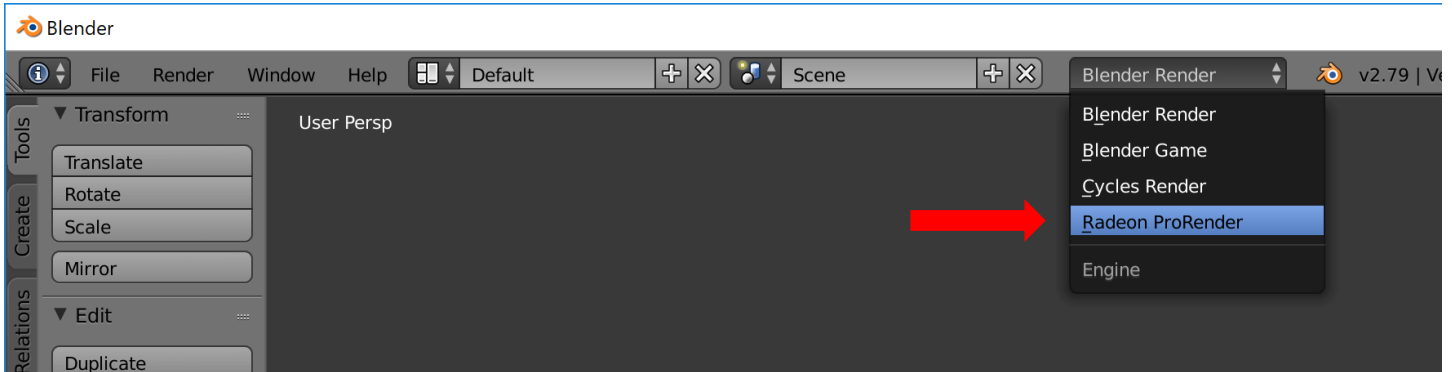


Select the Blender installation directory. Unless you installed Blender in a non-standard place, click ok. Point to the usual location of the Blender app (/Applications), else just click **Choose**.

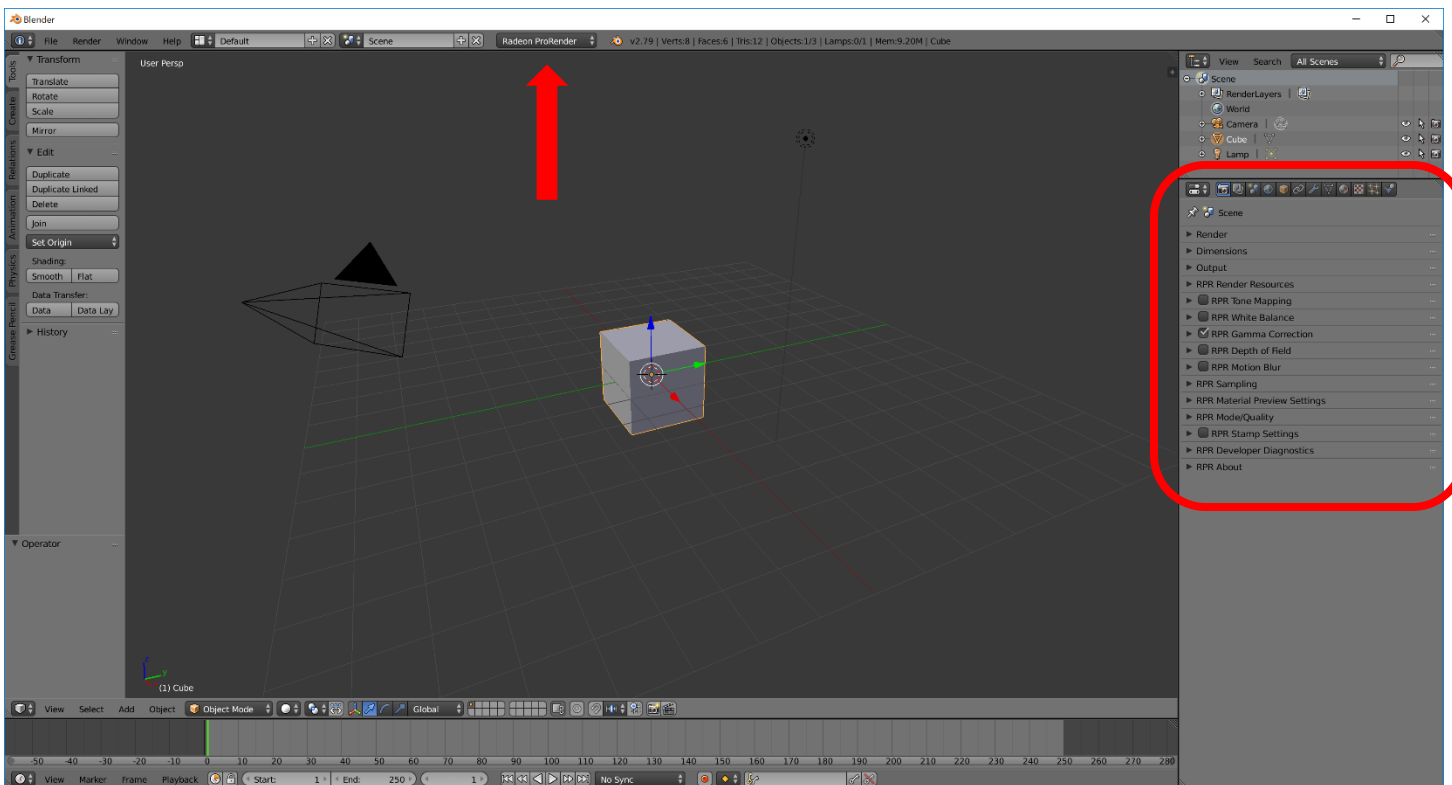


# Switching to Radeon ProRender

Launch Blender. In the Info header, select Radeon ProRender in the renderer dropdown. If you don't see it in the dropdown, check Add-ons, and activate it there.



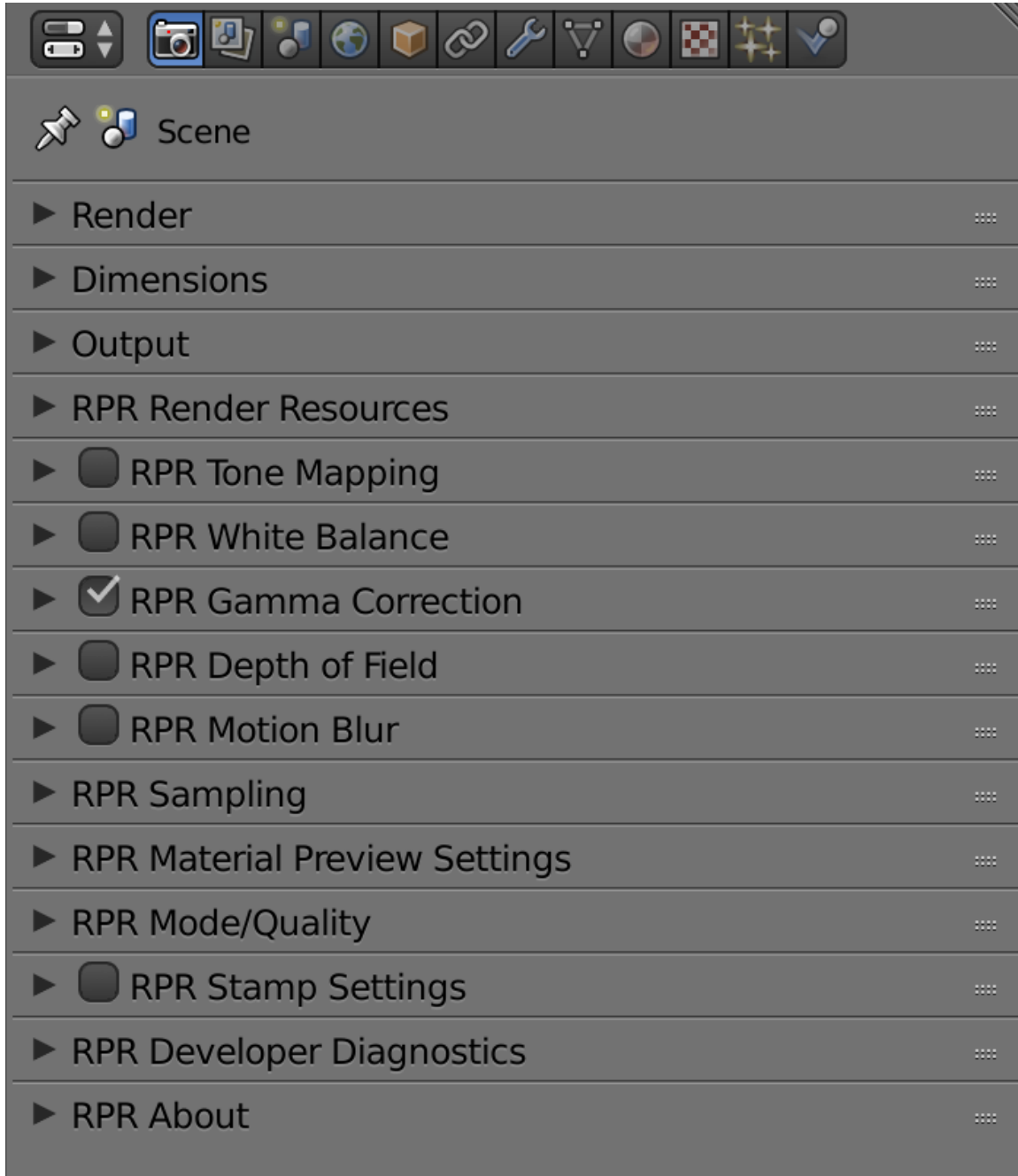
If Radeon ProRender is activated, the content in the Render Panel/Render Setup should change to Radeon ProRender -specific settings.





# Scene Settings

Once you've changed your renderer to Radeon ProRender, you will have access to the following render settings.



## Render

Under Render, the output can be a still image, or an animation without or without audio.



**Note:** Radeon ProRender follows the Blender standard, meaning renders will be displayed in the UV/Image Editor, and the display options are the same as in Blender native, meaning that clicking the lock next to the dropdown will lock the interface at rendertime to give more memory to the renderer.

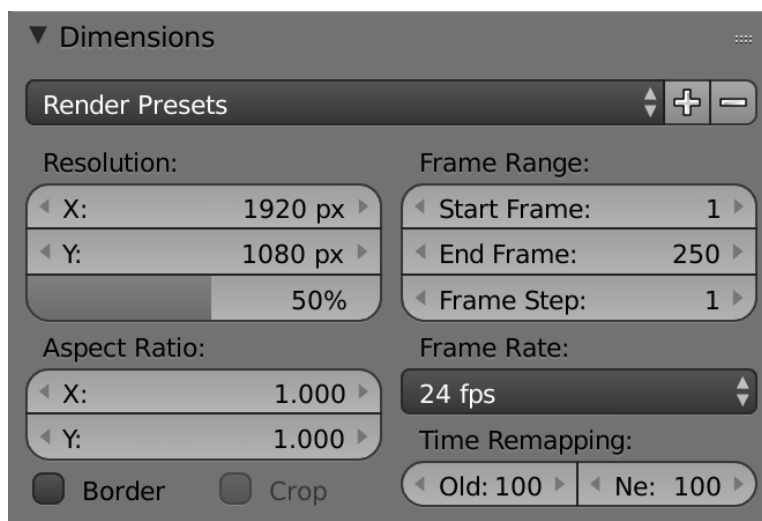


The display dropdown will let you select between:

- **Keep UI** – The image is rendered to the UV/Image Editor, but the UI remains the same. You will need to open the UV/Image Editor manually to see the render result.
- **Image Editor** – A new floating window opens up, displaying the render.
- **New Window** – One of the existing editors is replaced with the UV/Image Editor, showing the render.
- **Full Screen** – The UV/Image Editor replaces the UI, showing the render.

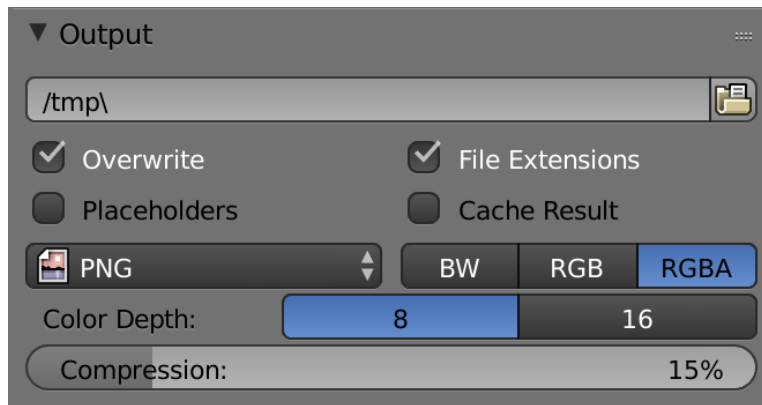
## Dimensions

Set the sizing and resolution for your render output. You can choose between custom settings and presets from the dropdown. This is also where you define your frames and framerate for animation.



## Output

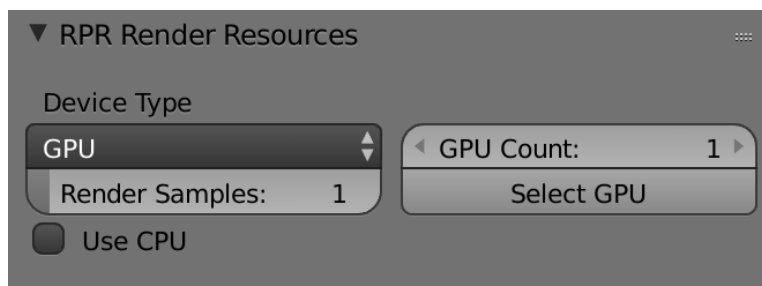
Lets you define where and how to save your render output.



## Render Resources

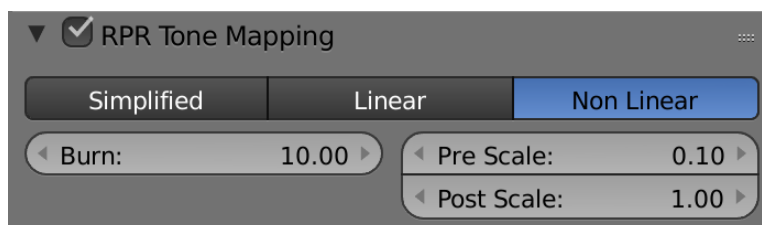
Render Resources lets you define your rendering device(s). First select your rendering mode – CPU or GPU. Then select your devices in the dropdown. You can use multiple GPUs or CPUs.

If your GPU(s) are incompatible, Radeon ProRender will usually default to CPU-rendering. If it doesn't, you will need to set it manually.



## Tone Mapping

Tone Mapping allows you to change the brightness and/or contrast of your image or animation based on real life camera settings or algorithms. Radeon ProRender provides three settings for this.



### Simple

This is a simple exposure tweak and contrast option. You can brighten or darken the image by controlling the exposure, or having brighter or darker contrast.

### Linear

This is based on real-life camera settings. ISO is film speed – the higher the value, the more light is let into the image. F-Stop is aperture width, and follows regular camera settings – the smaller the number, the wider the aperture, and the more light will be transmitted to the film. Shutter Speed is how long the shutter stays open to let in light, also known as exposure.

### Non linear

This is also known as Reinhard which is aimed at adapting the high dynamic range of real world lighting to your screen.



**Note:** It does this by letting you set values for Burn, Post Scale and Pre Scale. Pre Scale and Post Scale work together, this means that if you tweak one, you'll probably have to tweak the others.

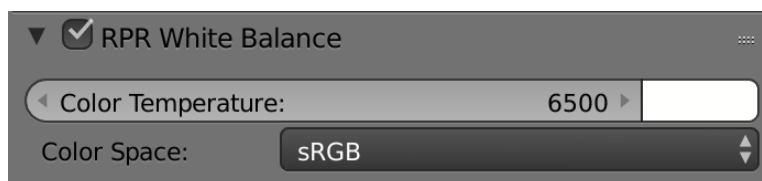
Pre Scale controls the brightness of darker areas (i.e. shadows). Post Scale controls the final brightness of the image and Burn is used to tweak the brightness of highlights in your image based on its darker areas.

## White Balance

White Balance follows the basic settings of a digital camera – lets you set the color temperature of the light in the image.



**Note:** A color temperature is set in Kelvin – a lower value will turn your light a cold blue and a higher value will give it a warmer tone. The default is 6500 which will give you nice white light and highlights.



**Note:** Whenever a white box is apparent, you can set a specific color and you can choose between several colour spaces.

**Colour Space:** Rec. 2020, DCI P3, Adobe RGB, Srgb

### Colour Picker

Specify the colour using the RGB (Red, Green, Blue), HSV (Hue, Saturation, Value/Brightness) or Hex colour space.



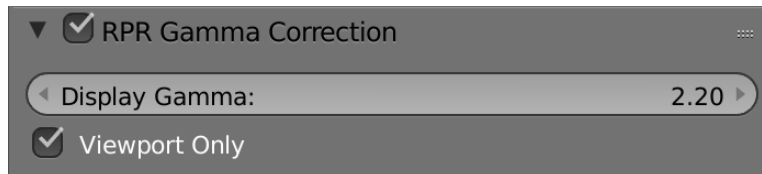
**Note:** Whenever you see the white rectangle, you are able to choose a color using this color palette.

## Gamma Correction

This will make the scene look brighter or more faded out. You can choose to set this in the render window, or in the viewport only.



**Note:** Radeon ProRender for Blender follows the Gamma 2.2 standard, meaning it will look correct out of the box. If you decide to tweak your Gamma settings, remember you may need to tweak your tone mapping as well.



## Depth of Field

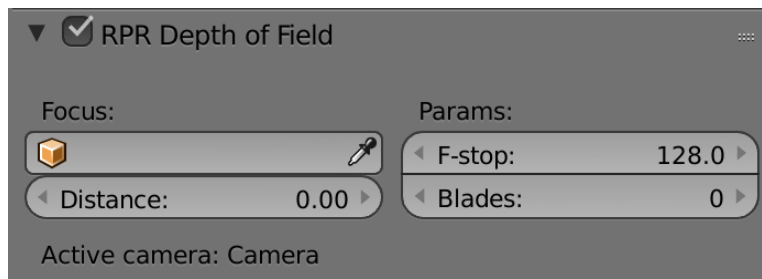
This will let you focus on an object in the scene and blur the foreground or background surrounding it via the camera settings.

Once you've checked the checkbox to activate it, Radeon ProRender will show a Focus dropdown listing scene items the camera can focus on, as well as giving you the option to pick a camera.

- **F-stop** – In this context, the F-stop controls the blur in the image. If you stop down to low settings, you will get more blur in the areas that don't have focus.
- **Distance** – If you chose to just use the camera, the Distance parameter defines which area in your 3D space will be the focus based on the distance you define here – the focused area defined by distance will be clear, the rest blurry.
- **Blades** – Blades define the amount of bokeh in your image, if any. Low settings will give you hexagons, high settings will give you circles.



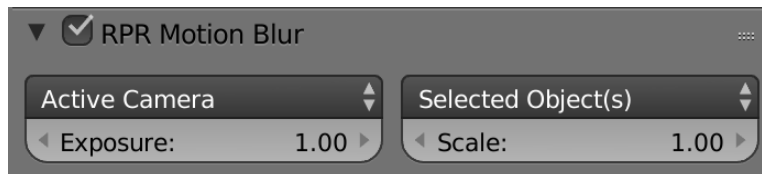
**Note:** This changes the DOF from the active camera view. Press Num Pad 0 to shift to the active camera view.



## Motion Blur

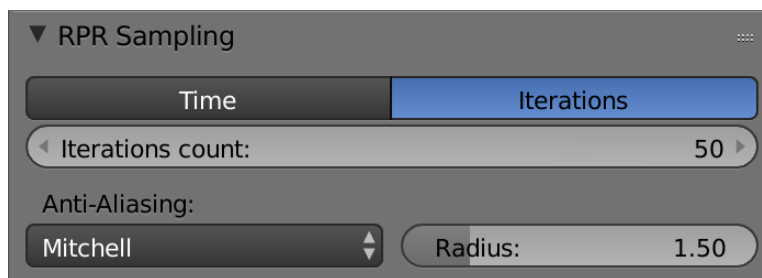
As with other cameras, Radeon ProRender's Motion Blur will make object appear as if it's in motion, in stills as well as animations. You can select whether to use Geometry – an object in your scene – to blur, or the image or frames themselves.

- **Exposure** - longer exposure means more motion blur
- **Scale** – the scale of the motion blur



## Sampling

Limit the rendering samples by time or the number of iterations.



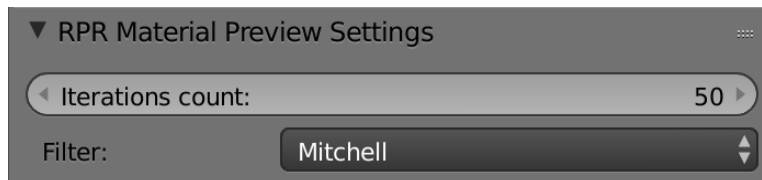
### Anti-Aliasing


Like with Blender's native Anti-Aliasing, Radeon ProRender's anti-aliasing smooths the pixels in an image, by oversampling single pixels as if they were five pixels or more, and calculating the average. This will in many cases get rid of the harsh edges you can see in some renders with no AA set. There are several algorithms to calculate this, and Radeon ProRender has added Lanczos and Blackman/Harris as well as some of the standard ones.

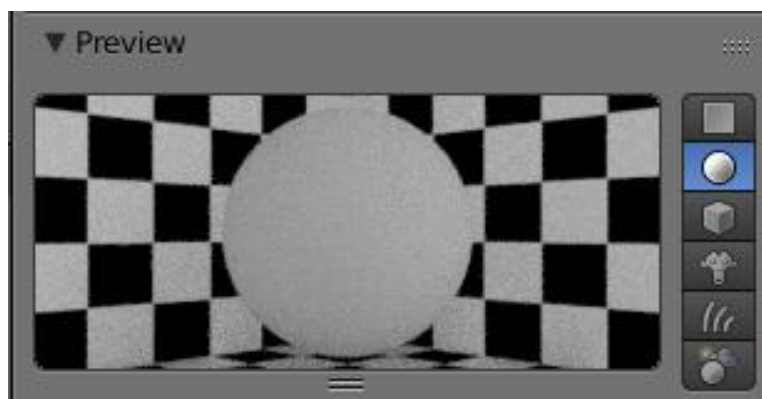
A high number of samples gives you a better render at the cost of render time. The width changes the width of the filter and the grid refers to grid pattern for the AA grid – the smaller the grid the higher the render time.

FILTERS	DESCRIPTION
<b>TRIANGLE</b>	equivalent to Blender's Tent – for sharp results
<b>MITCHELL</b>	default filter, good for all-round rendering on images with no major high contrasts
<b>LANCZOS</b>	a second good all-round filter
<b>GAUSSIAN</b>	provides blurry Anti-Aliasing
<b>BOX</b>	the lowest quality Anti-Aliasing filter
<b>BLACKMAN HARRIS</b>	complements the Box and Gaussian filters, and is especially effective for Wireframe renders, as it makes edges look smoother

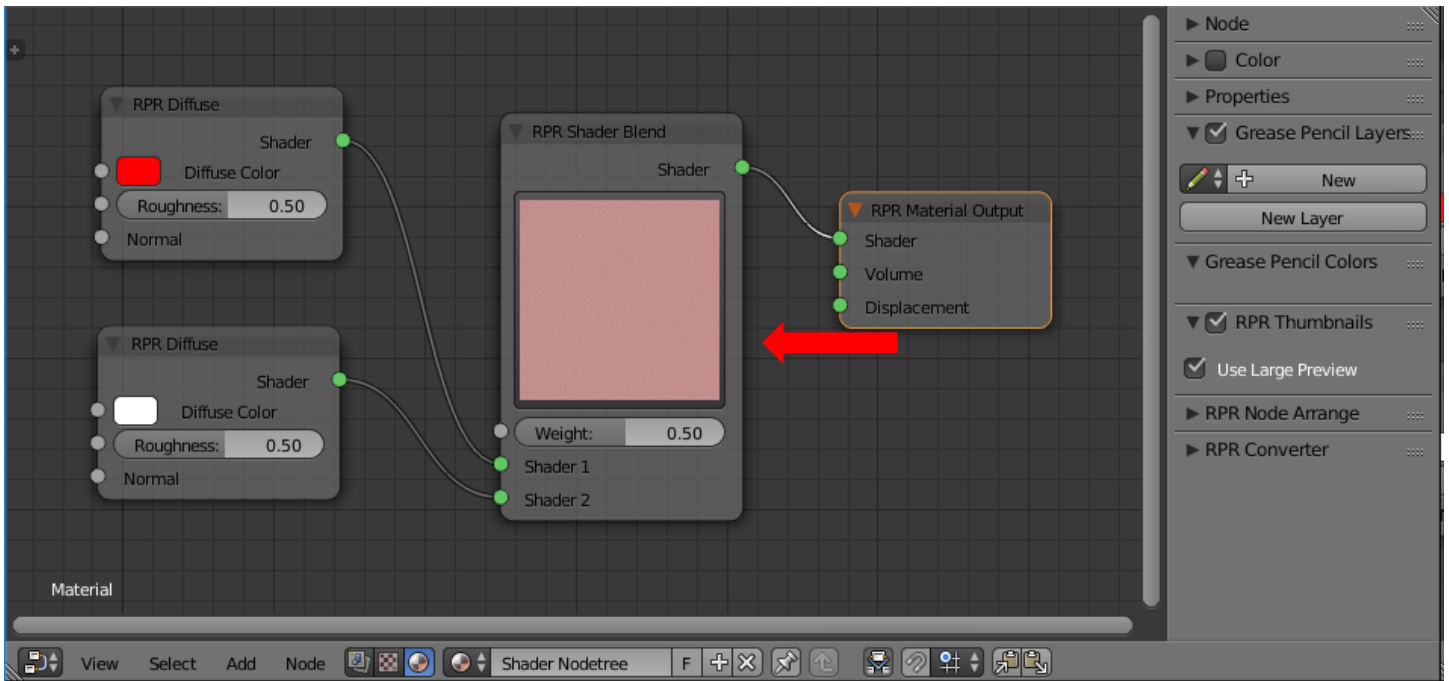
## Material Preview Settings



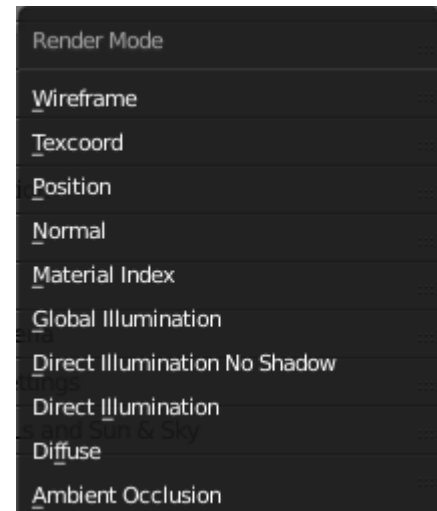
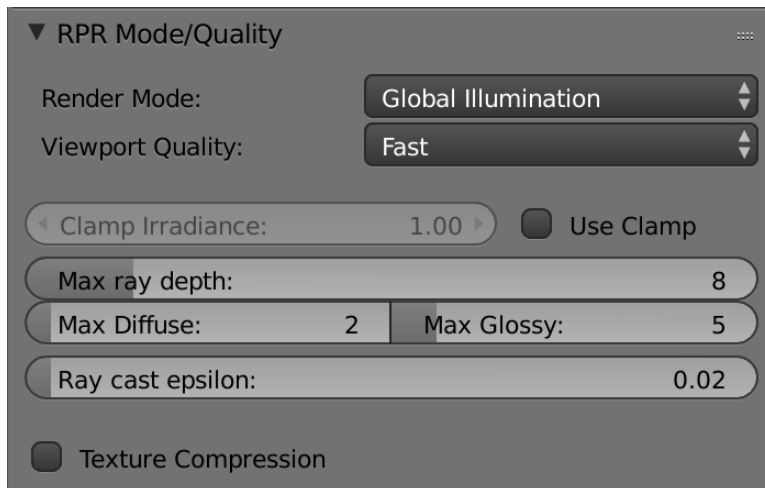
This will preview the material's Radeon ProRender thumbnails. Useful for mixing different shaders and previewing the color in the NodeEditor. Click on the object in the viewport. Apply a material by selecting the Material tab  and clicking **New**. The material preview iterations will be evident in this section.



In the node editor, there is also a material preview option, such as using the **RPR Shader Blend**. Check the **RPR Thumbnails** checkbox and choose to have a large preview or a small one.



## Mode/Quality



This is used for the final shot, or for the viewport and they are set independently.



## Render Mode

Render Mode changes the look of the 3D model in the viewport.

MODE	DESCRIPTION
<b>WIREFRAME</b>	shows the wireframe of the mesh
<b>TEXCOORD</b>	shows the current texture coordinates UV'd or not
<b>NORMAL</b>	renders the normals of the scene – not to be confused with baking
<b>MATERIAL ID</b>	renders the whole scene in non-bordering colors to ease postwork/processing
<b>GLOBAL ILLUMINATION</b>	the full scene with full GI lighting and shadows.
<b>DIRECT ILLUMINATION NO SHADOW</b>	direct light, no GI, gives sharper renders without any shadows or semi-shadows
<b>DIRECT ILLUMINATION DIFFUSE</b>	renders the scene with shadows, but no GI – gives “harsher” renders. renders the scene with textures only
<b>AMBIENT OCCLUSION</b>	standard pass to do anything from showing off your models without textures to using it as an overlay for contact shadows, which GI doesn't always catch

## Max Ray Depth

Max Ray Depth changes the number of times that a ray bounces off a surface to capture reflections.

Notice the image quality of the model when using number of ray bounces of 1 (left) and of 5 (middle) and of 20 (right). The transparency and colour of the object is improved with more ray bounces. In the left most photo, the object is black, since the surrounding light is unable to reach the inner surfaces due to a low ray bounce setting.

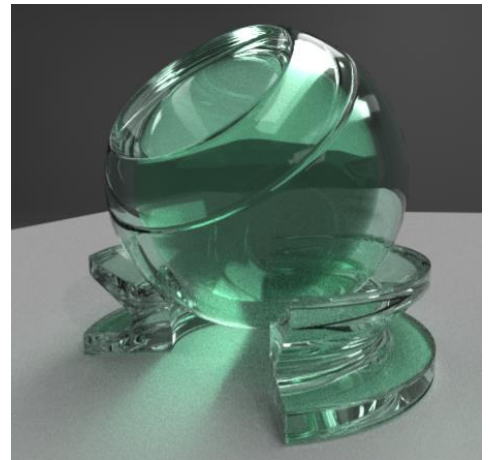
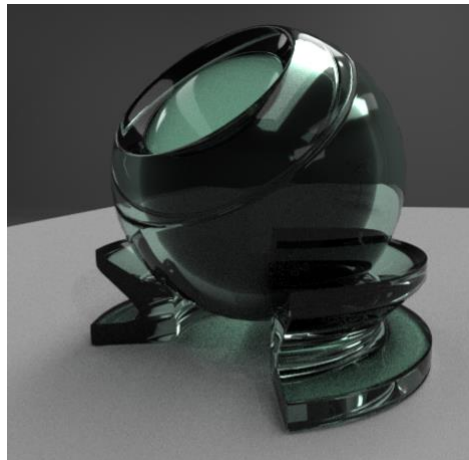
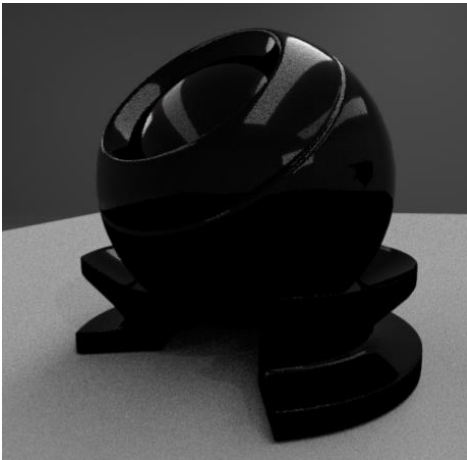


**Tip:** When using glass or other translucent appearances, use a high number of Ray Bounces to fully capture all reflections (generally, a good number is 6 unless there are complex, translucent parts).



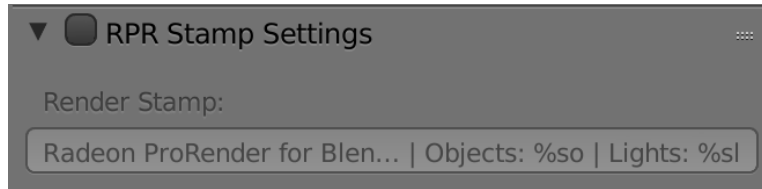
**New in v1.6:** Max ray depth can also be controlled for diffuse and specular ray depths separately. Thus for scenes with many nested transparent objects, set a high specular ray depth. Diffuse ray depth is usually fine to leave at 1 or two.

Improved image quality comes at a cost to other factors. The right render took more time than the left render to produce qualitatively, the same image quality.

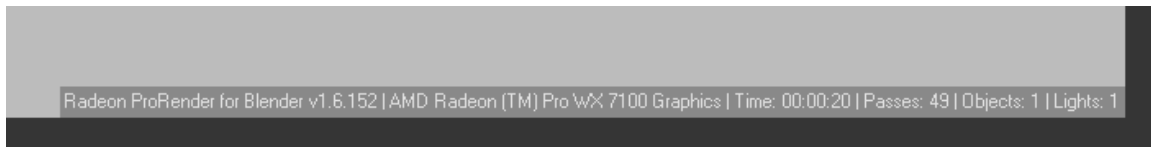


## Stamp Settings

This will create stamp on final rendered image showing details of hardware and Blender scene information.

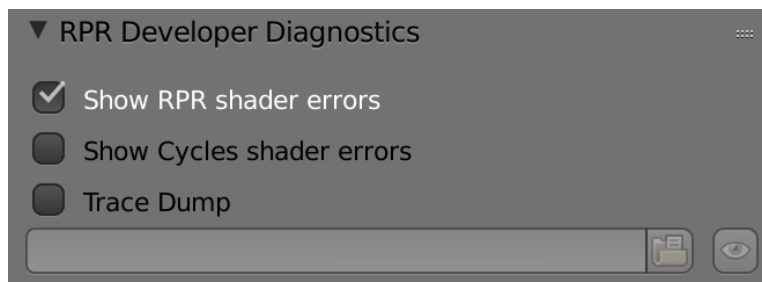


This is the stamp on the rendered image.



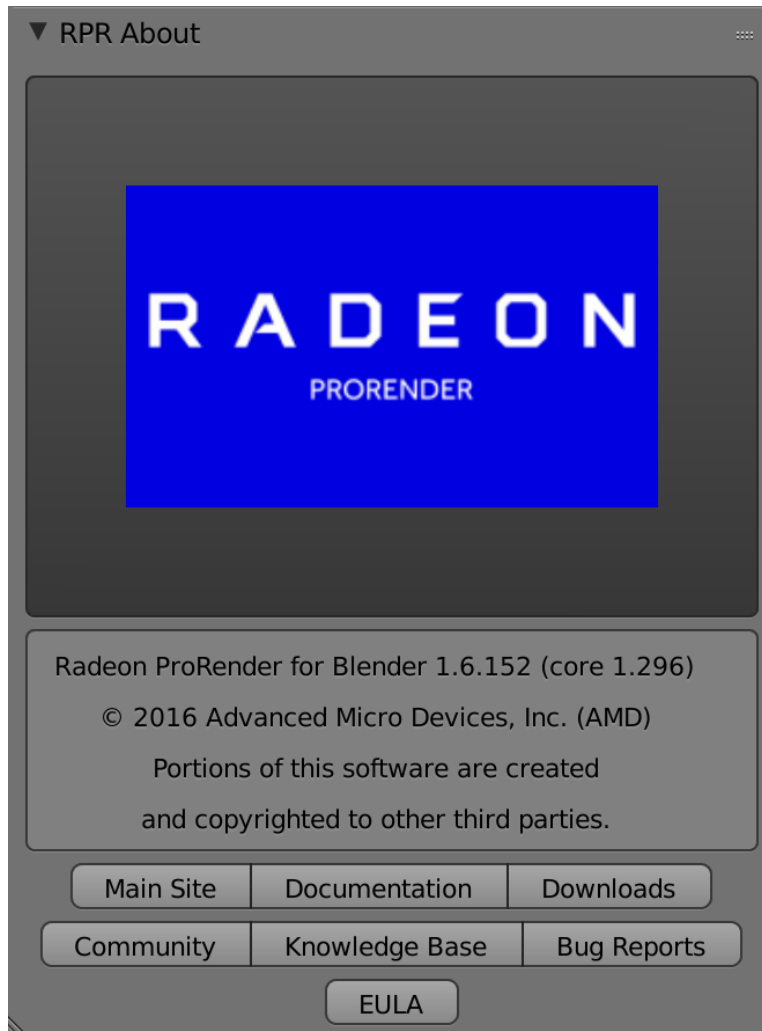
## Developer Diagnostics

Should you be so unfortunate as to experience crashes, please turn on the Trace Dump. The Trace Dump will not store any kind of personal information, it will simply enable the developers to pinpoint how and why the crash occurred based on the data present in the scene – and hence the trace file.



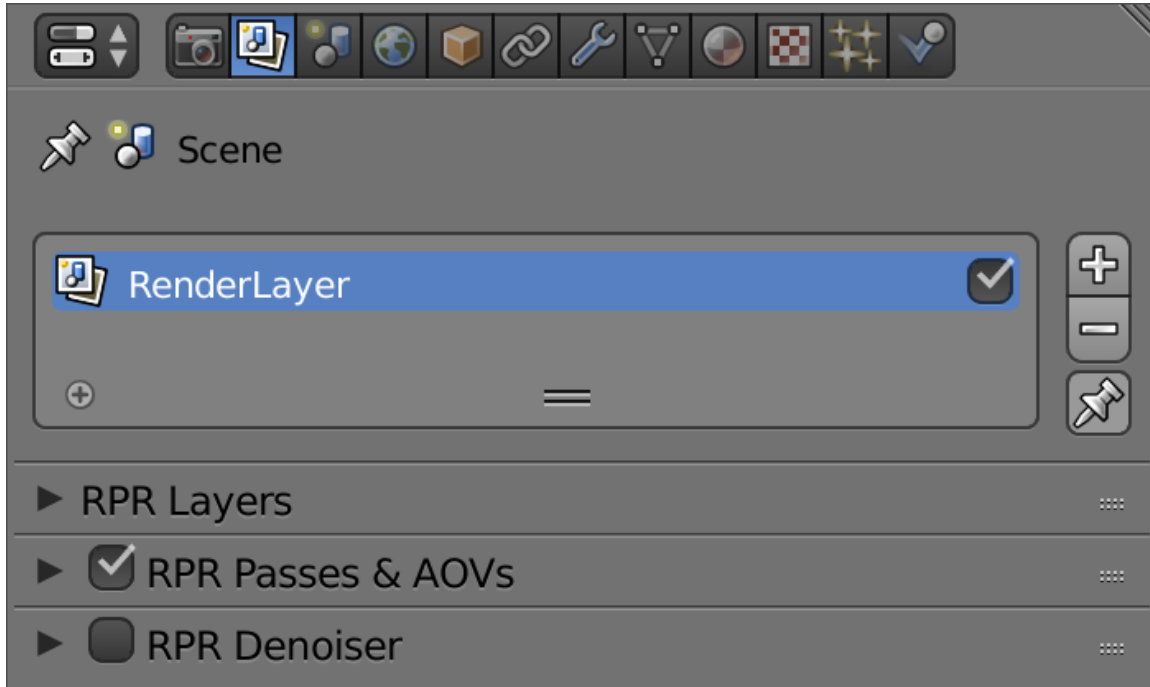
## About

This section displays developer information.



# Render Layers Settings

Render Layers allow you to render your scene, or items in your scene in layers. This is handy if you are compositing or doing postwork.

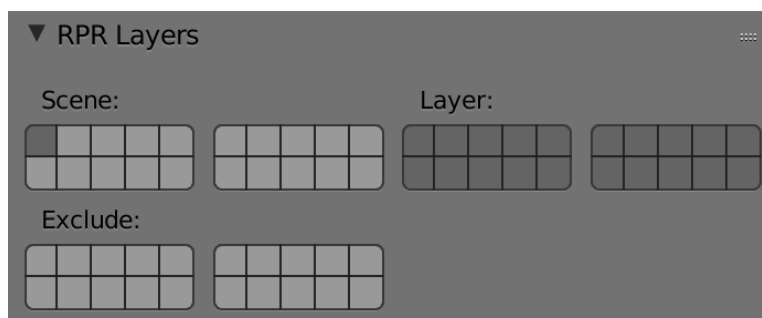


## Layers

The **RPR Layers** settings follow the Blender standard setup, where you add layers containing scene elements and their render settings to the layer list.

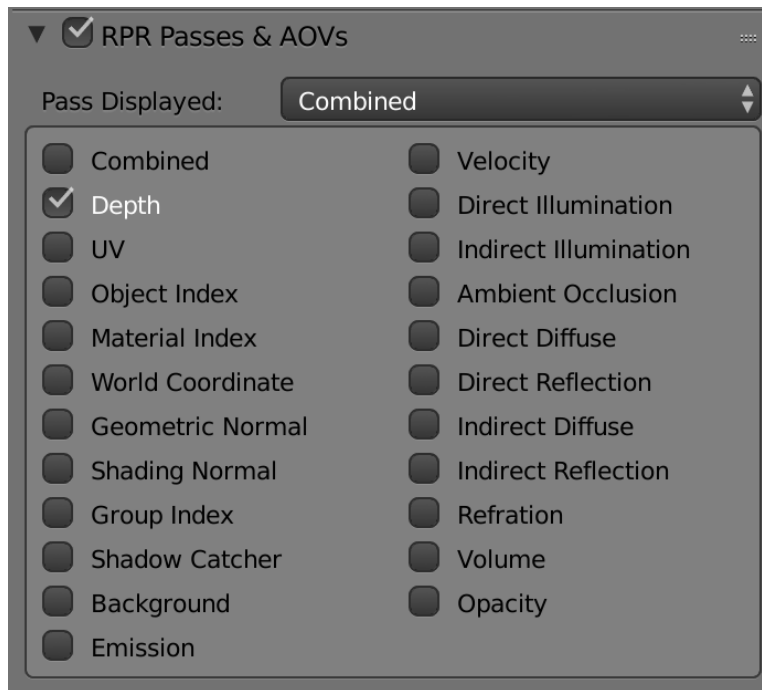
Only visible layers will be rendered.

- **Scene** shows the scene layers currently visible.
- **Layer** shows the scene layers associated with Radeon ProRender, and they will render the objects and materials associated with Radeon ProRender.



## Render Layers/Passes & AOVs

Radeon ProRender supports both Render Layers and AOVs to support post work and compositing.

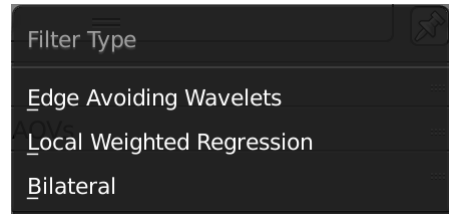
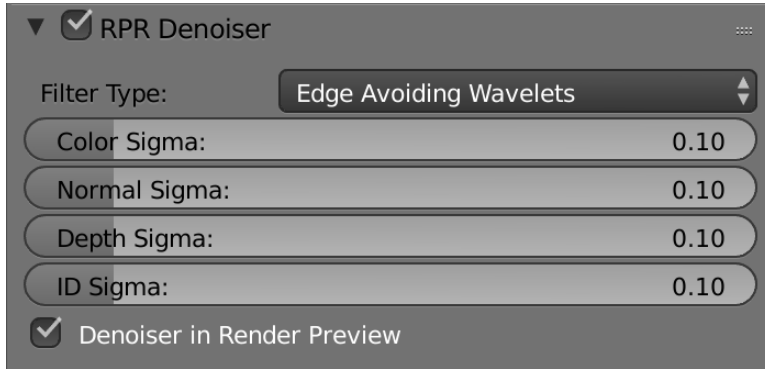


PASSES	DESCRIPTION
<b>COMBINED PASS</b>	color of the object – default
<b>OBJECT ID</b>	equivalent to Blender native's Object Index. It creates a mask of the material which can be read by the ID Mask Node in the compositor
<b>DEPTH</b>	equivalent to the Z or Mist pass, and renders the depth in the image in greyscale
<b>SHADING NORMAL</b>	equivalent to Blender native's surface Normal for shading
<b>GEOMETRIC NORMAL</b>	renders normals based on camera angle
<b>MATERIAL IDX</b>	it creates a mask of the material which can be read by the ID Mask Node in the compositor
<b>UV</b>	renders the UV coordinates
<b>WORLD COORDINATE</b>	used for compositing, the RGB values in this pass correspond to the XYZ axii on the object(s) or in the scene
<b>GROUP INDEX</b>	An ID color set for groups. Not currently used.
<b>SHADOW CATCHER</b>	Output from shadow catcher objects
<b>BACKGROUND</b>	The background color
<b>EMISSION</b>	Output from emissive objects
<b>VELOCITY</b>	Direction of motion

## Denoiser



**New in v1.5+:** Enable the checkbox, select the filter type and how fine or wide you want to filter the image with the settings. Using a finer filter will preserve more image detail, while a wider filter will give less noise. This should allow you to get noise from your render while keeping samples and render times low.



The image on the right has denoiser turned on.

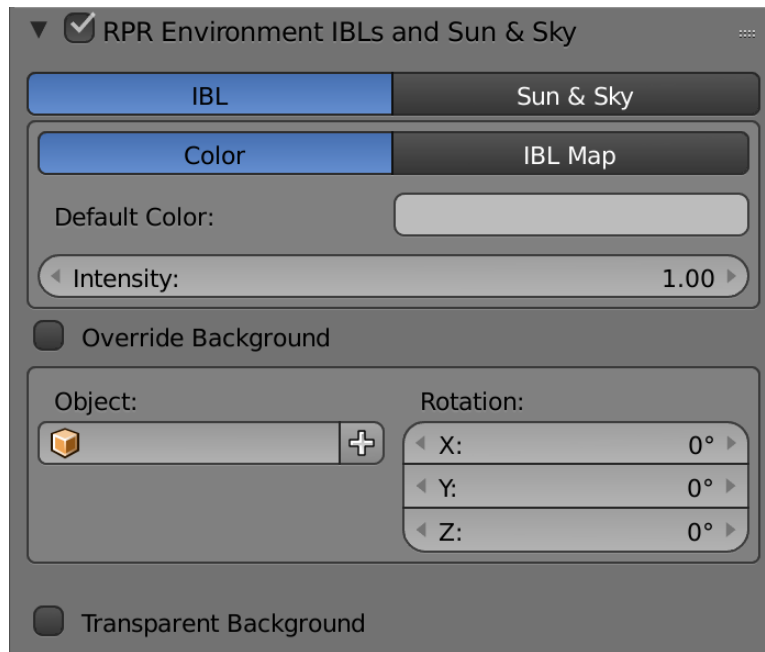


# World Settings

## Environment IBLs and Sun & Sky

### IBLS

You can just use the native, single color setup for completely neutral GI lighting or you can pick the color via RGB, HSV, or Hex.

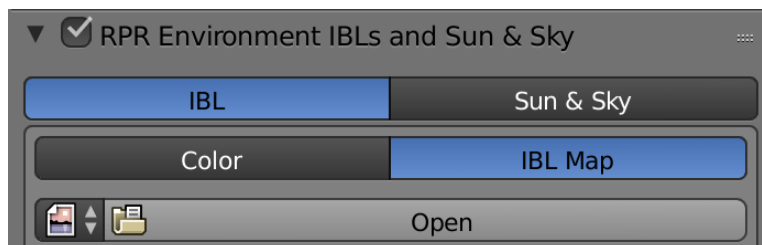


You control the intensity of the lighting via the Intensity slider, or you can load an HDR or EXR to illuminate your scene without showing the IBL itself. If you opt to use the latter, the intensity will also be controlled via the intensity slider.

If you set override background, you can set the background color or IBL map independently of the world lighting. the Transparent Background option allows you to give the background a 0 alpha while still showing the color/map.



**Cool fact:** If you render a scene using an HDR with an HDR, you get a stacked HDR you can re-use for other scenes – just mind your copyright.

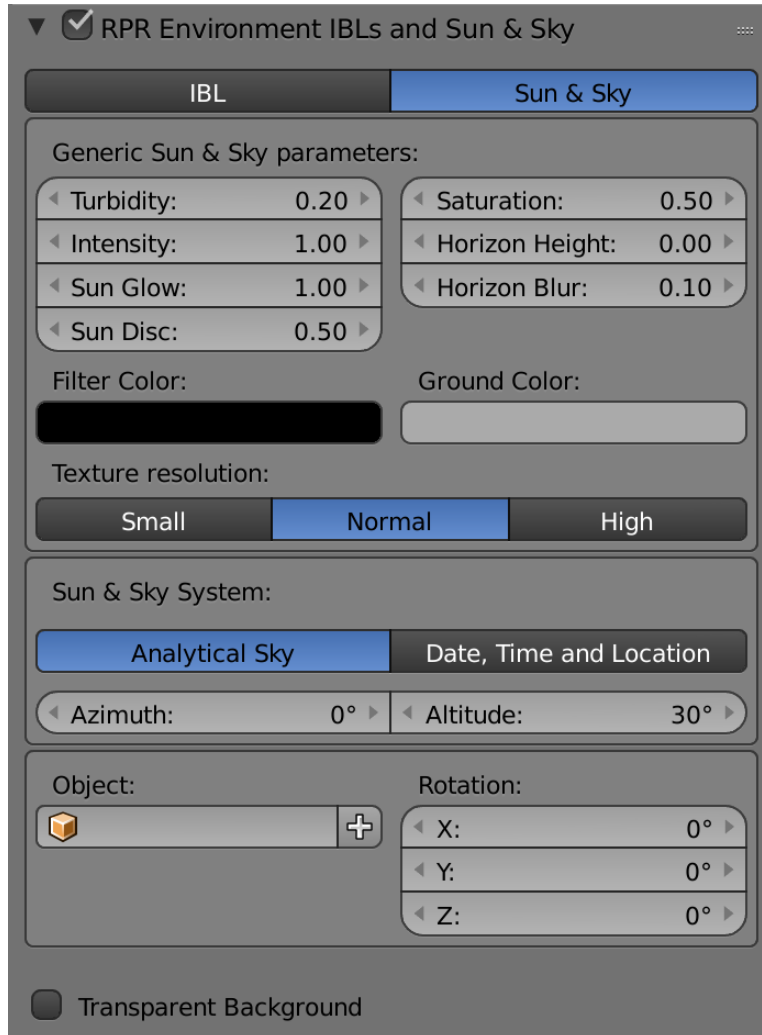




Your IBL will determine how the lighting in your render is reflected or refracted onto the surfaces of the model. You can use alternate images or colours to change this. One way to fake soft reflections, for example, is to use a blurred copy of your lighting IBL to generate this without having to tweak your settings too much.

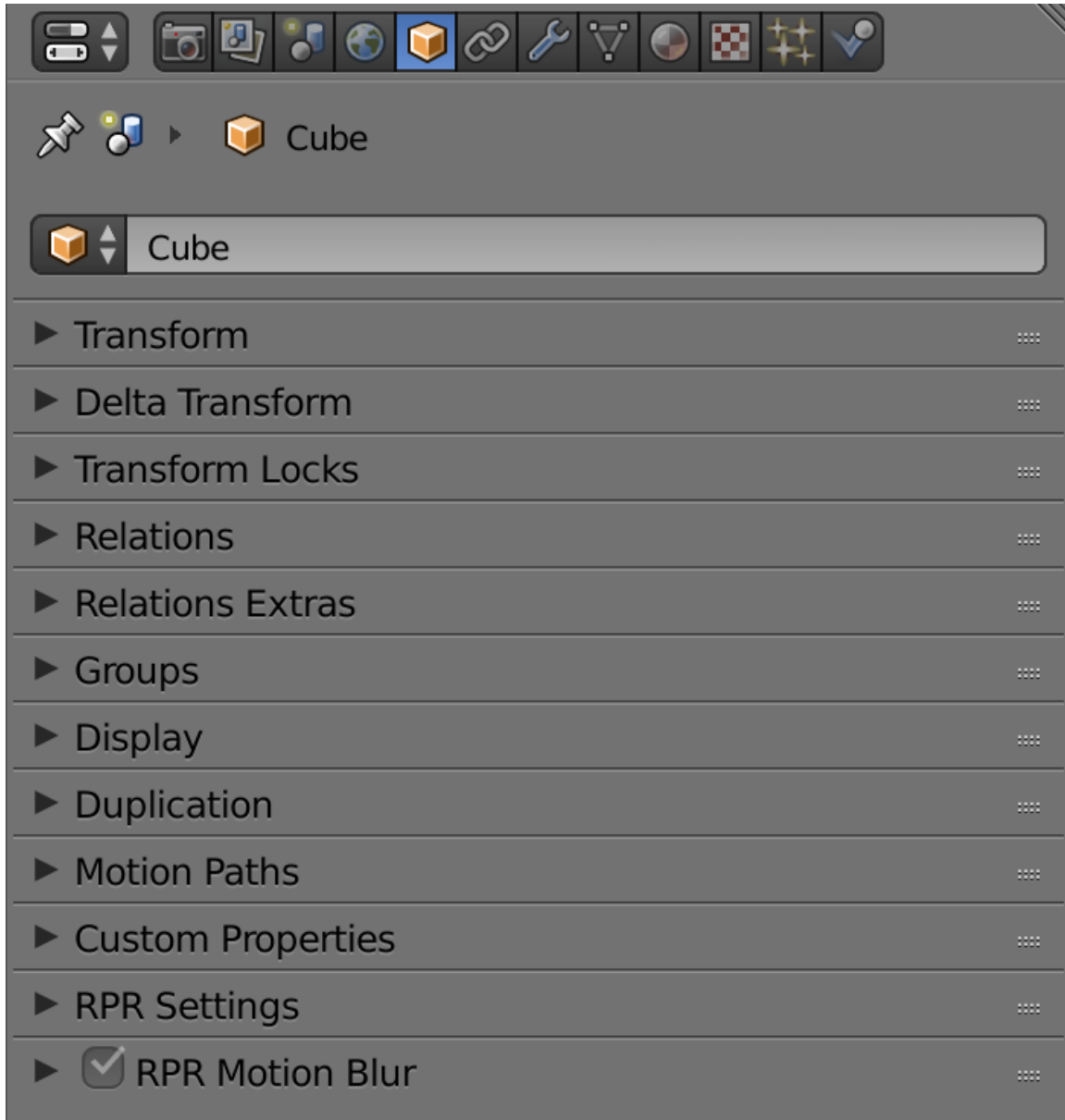
### Sun & Sky

Radeon ProRender can simulate a sun & sky background. You can even set the environment depending on a location in the world by clicking the Date, Time and Location toggle.

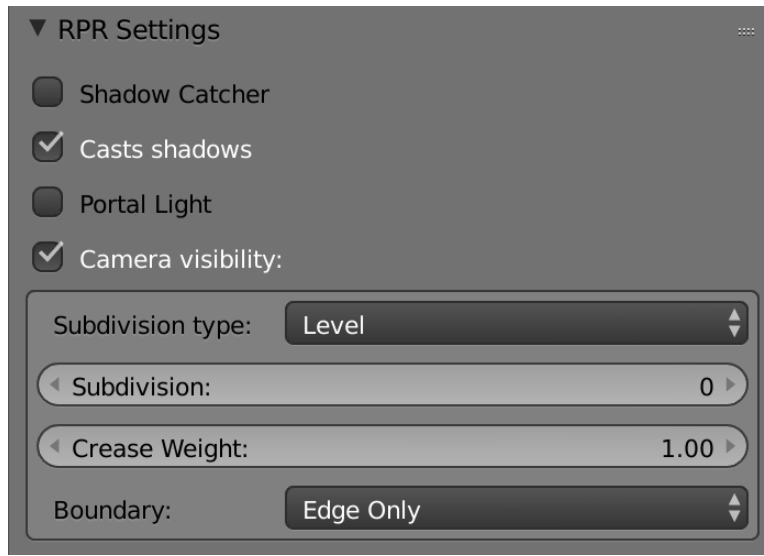


# Object Settings

Radeon ProRender has a few options under Object:



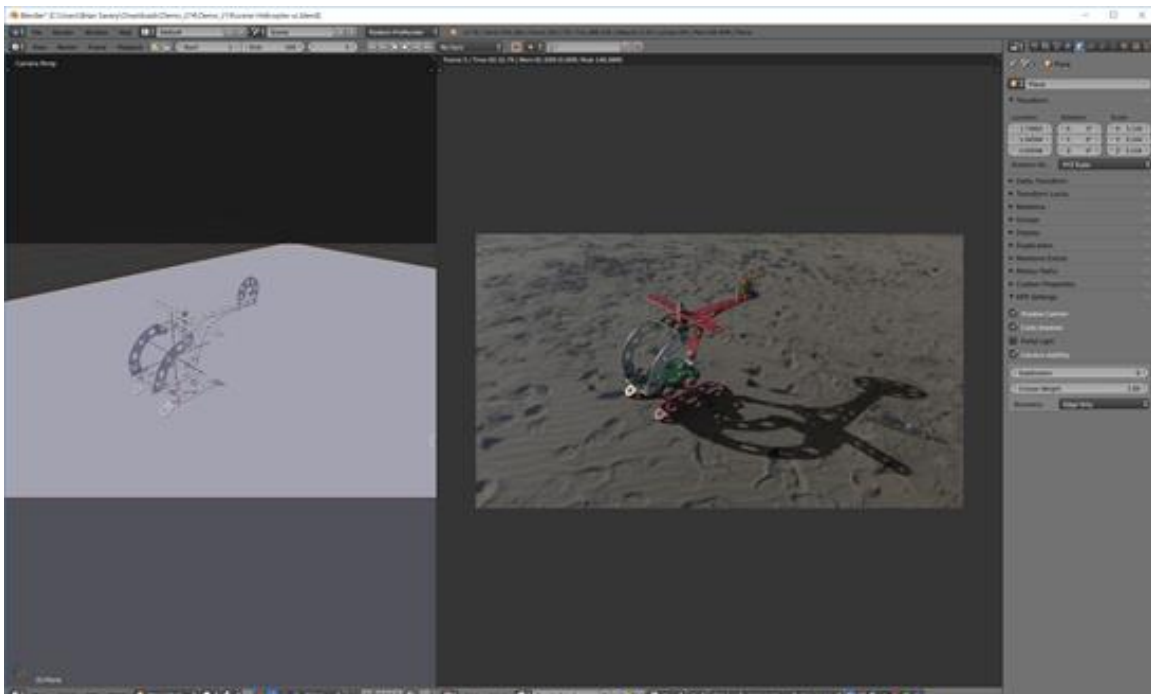
## Settings



**Shadow Catcher** – Follows the general 3D workflow of setting up a plane or object capable of receiving shadows and becoming transparent, so it can be seamlessly incorporated into i.e a backplate or an IBL.



**New in v1.4+:** Objects can be marked as shadow catchers for compositing rendered shadows to a background.



**Casts Shadows** – enables shadows

**Portal Light** - Placed in windows or near the main light sources in your scene, a Portal Light is typically used to boost incoming GI/Environment light (from windows) in interior scenes. It does this to speed up rendering by sampling and boosting light more efficiently, thereby also reducing the noise in the render after less passes.

**Camera Visibility:** Make objects visible/invisible to main render. You could turn this off to make an object only show up in reflections for example.

**Subdivisions:** This subdivides your geometry at render time to give you finer and smoother mesh. There are two different modes:

- **Level Mode** - subdivides your geometry N times always.
- **Adaptive Mode** - Use this to adaptively subdivide your geometry. The setting is how fine geometry should be divided in pixel size. Thus, setting it to 1.0 will subdivide geometry to 1 pixel in size based on how close to the camera the object is. The advantage is an item that is far away from the camera will not be overly subdivided as it might with Level mode.

## Motion Blur

Set the scale of the motion blur. This will need to be enabled under the **Scene Settings** for you to adjust.

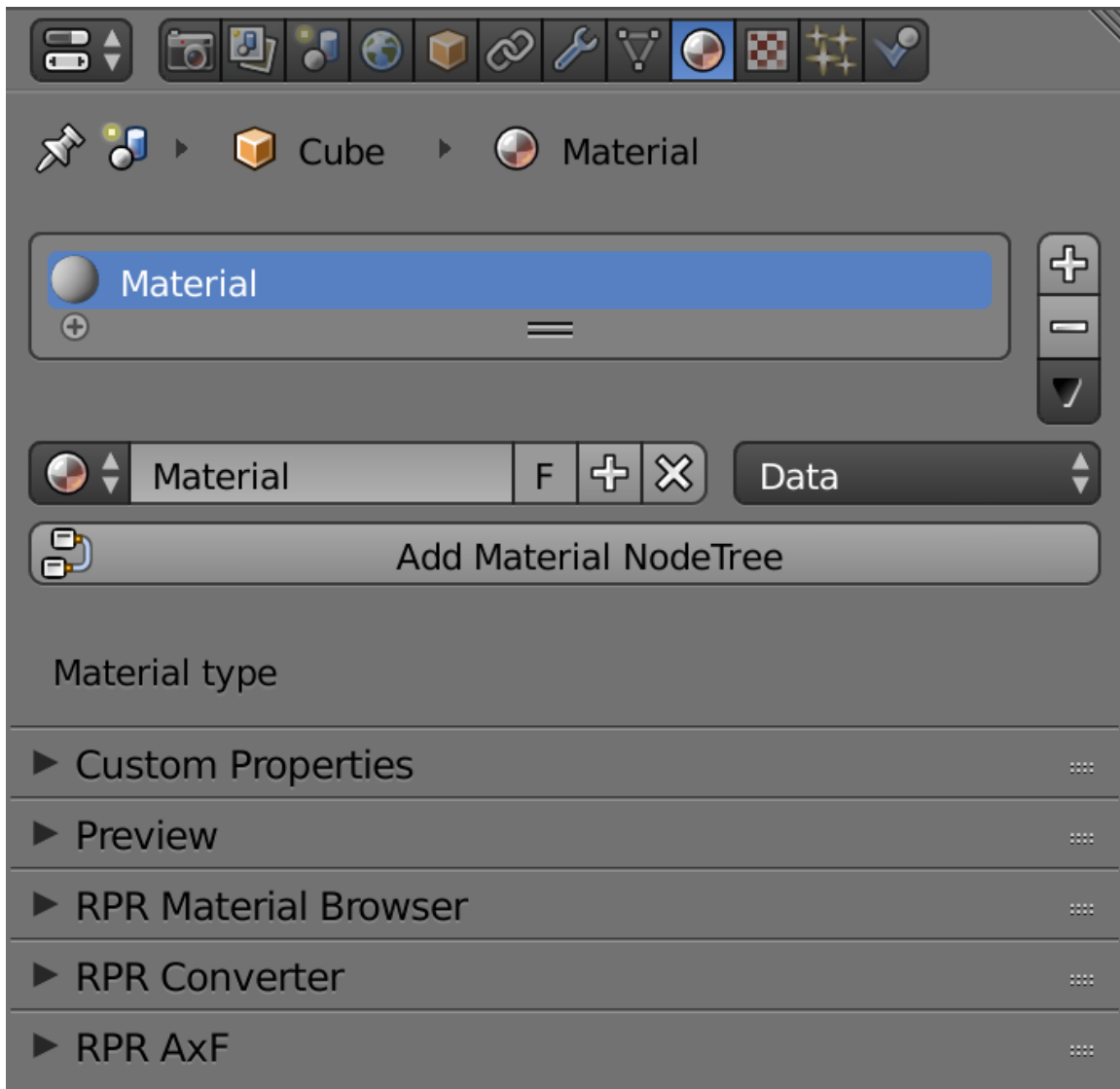


# Working with Materials

The Radeon ProRender Materials Panel will let you define options for a single, or multiple shaders, and follows the standard Blender workflow.

Access the Material by clicking the Material icon in the Object's properties editor. Add a new material by clicking the + sign next to the Active Material box, and the new material will display, ready for editing, as will the Radeon ProRender specific material options, such as:

- Shader selection and Shader settings
- **Custom Properties**
- **Material Preview**
- **RPR Material Browser** for Radeon ProRender specific materials
- **RPR Converter**, which converts Cycles Materials into Radeon ProRender Materials
- **RPR AxFTM ImporteR**



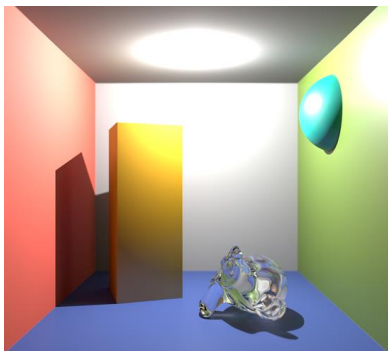
# Radeon ProRender Material Library

Radeon ProRender Materials Breakdown:

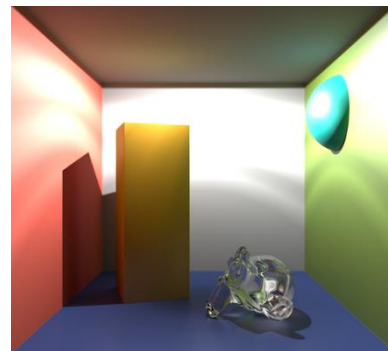
MATERIALS	DESCRIPTION
<b>RPR DIFFUSE</b>	either be a solid color, blends or texture map inputs
<b>RPR EMISSIVE</b>	used to emit glow or lighting cast on surrounding objects
<b>RPR MICROFACET</b>	used for metals and glossy surfaces
<b>RPR SHADER BLENDER</b>	used for blending two shaders together
<b>RPR DIFFUSE REFRACTION</b>	for light that goes through an object and bends at an angle. Diffuse refraction will scatter light in many angles
<b>RPR OREN NAYAR</b>	used for diffuse reflections on rough surfaces, like sand, rocks, cloth or plaster
<b>RPR WARD</b>	used for plastic and metal
<b>RPR REFLECTION</b>	used to generate only reflection. Will be used with Blend material to make more advanced materials such as glass and water
<b>RPR PBR SHADER</b>	a simplified version of Uber with the inputs set to match common PBR textures
<b>RPR UBER SHADER</b>	a more robust Uber shader that allows users to use a metallic material workflow common to many PBR Shaders. (Recommended to use this)
<b>RPR SUBSURFACE</b>	used for surfaces that does not reflect light off the surface like a mirror or water, but penetrates it a little, like candles, milk, skin or fruit, like grapes
<b>RPR VOLUME</b>	used for streetlights at night, fog or mist
<b>RPR DISPLACEMENT</b>	displaces vertices in a mesh based on an input texture's intensity



**New in v1.5+:** Area lights, as well as point lights, can use IES profiles.



*Without IES*

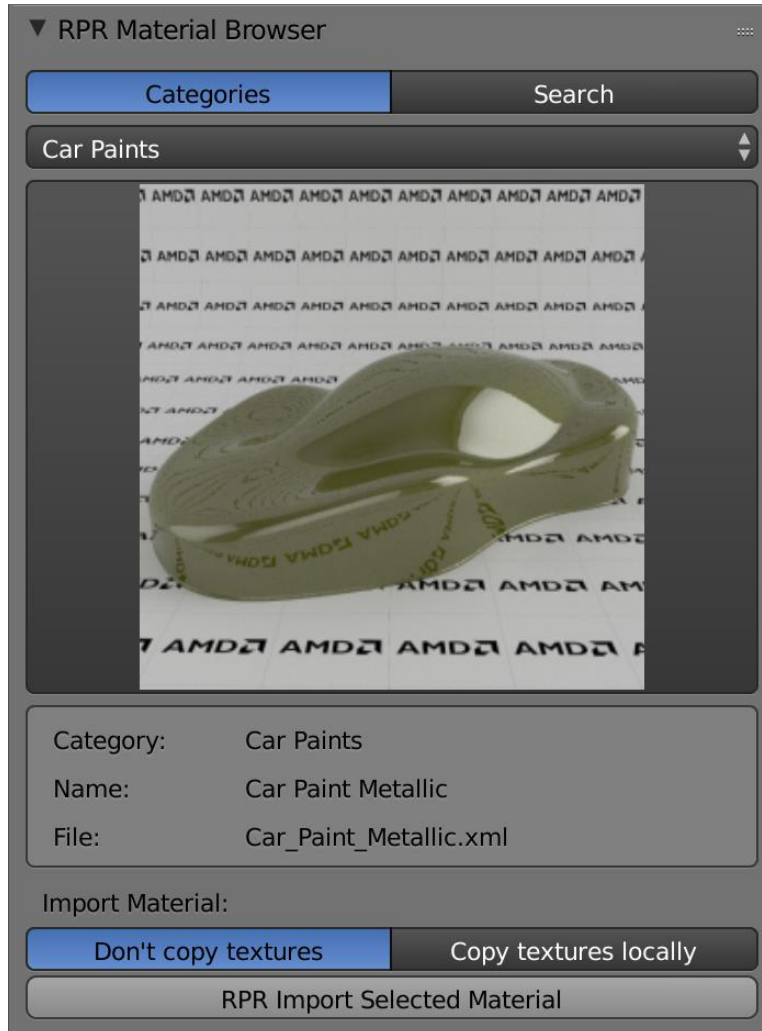


*With IES – modifies light scattering*

## Material Browser

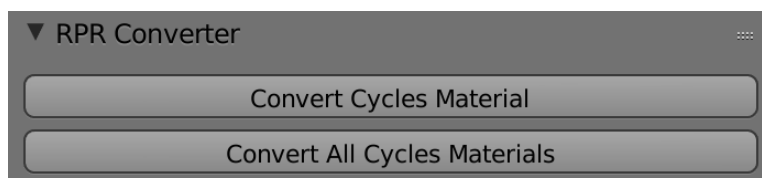
To help you get started, the **RPR Material Browser** contains several libraries of import-ready, and ready-made materials to speed up your work.

Simply browse to the Category or Material you want to use, or use the Search function, and click **RPR Import Selected Material**. Remember to copy textures locally if you plan on working offline.



## Converter

The **RPR Cycles Converter** lets you select single Cycles Materials, or all Materials available in a scene, and converts them to a Radeon ProRender Material.



## AxF

The Appearance Exchange Format is a vendor neutral “material” format which supports anything from single spectrums to full BSSRDF (i.e often used in CAD applications and other renderers).

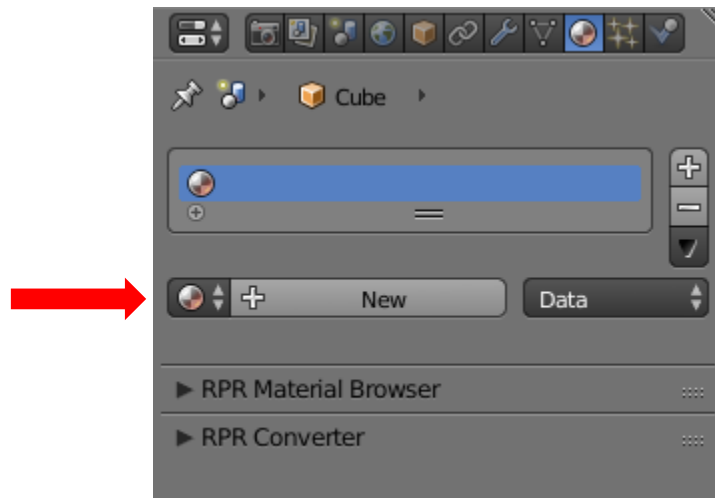
In order to use an AxF Material in Radeon ProRender, click the importer, select your AxF format file, and tweak your settings on import, if needed.



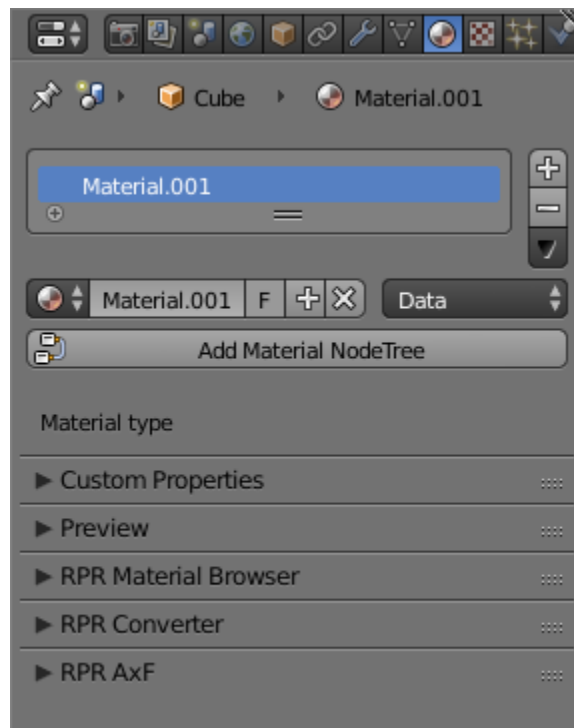


## Setting Object Material in Node Editor


Click on an object. In the materials tab, click New to create a new Material.

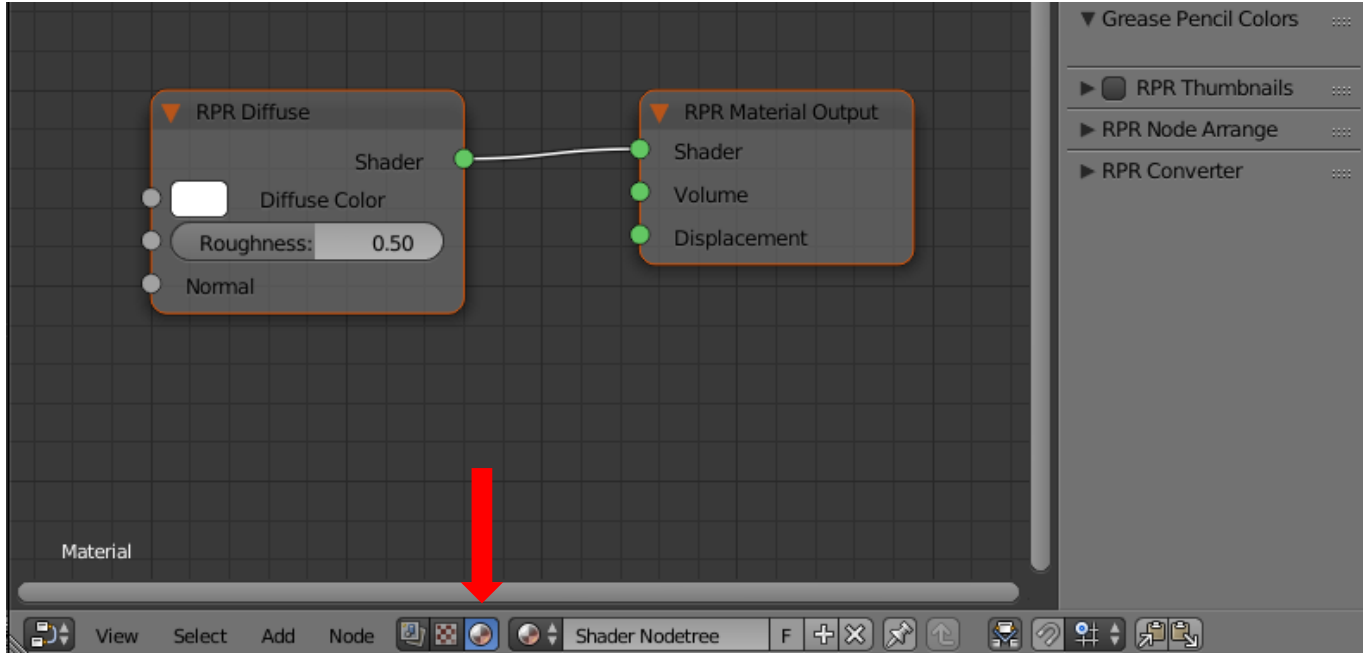


Click on **Add Material NodeTree** to view in the Node Editor.

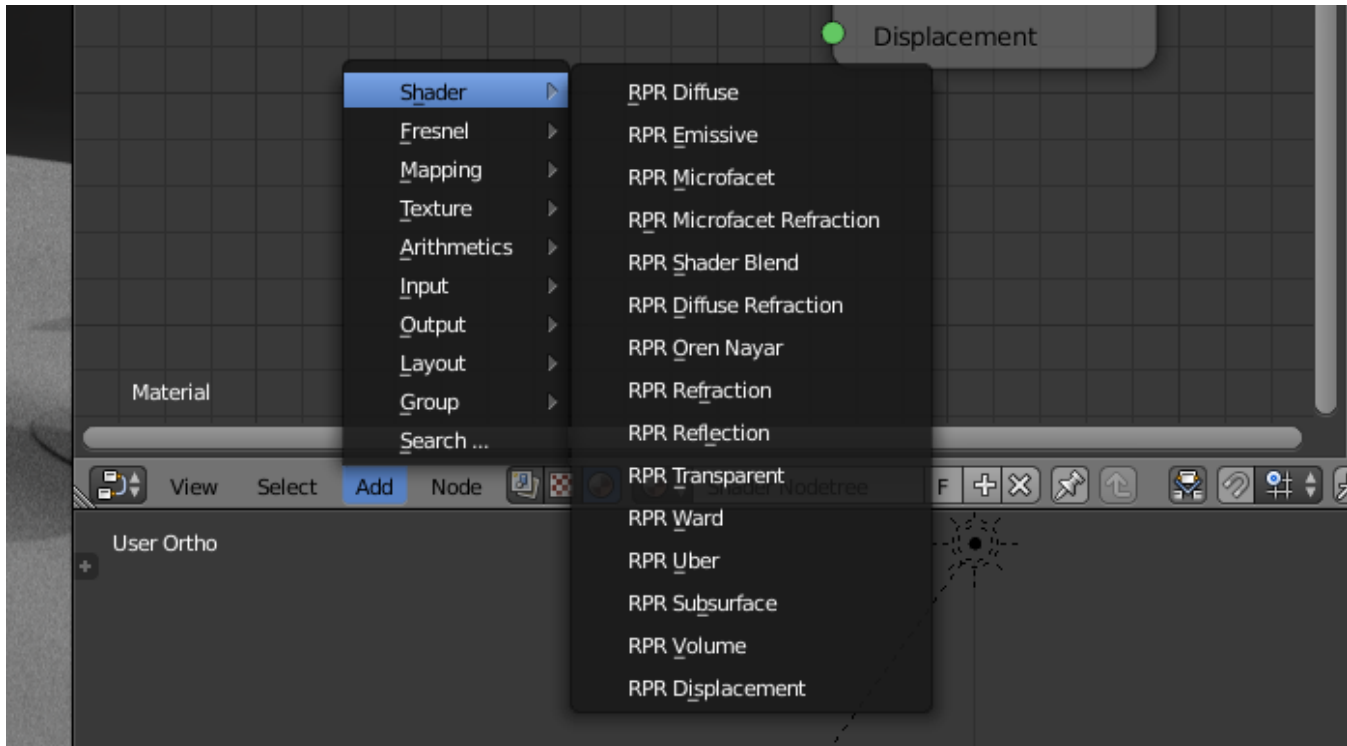


In the Node Editor, there should be a default **RPR Shader** and **RPR Material Output**.

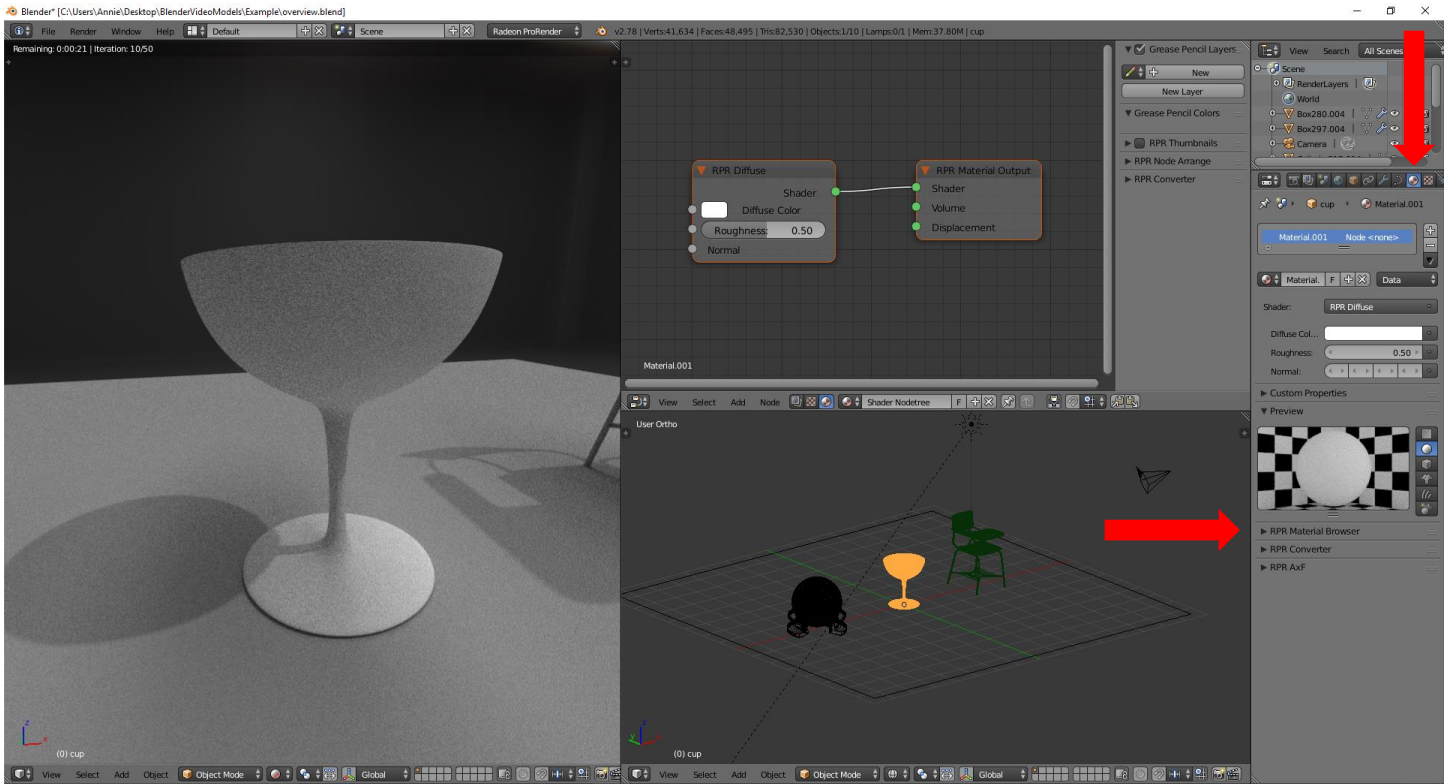
 **Note:** You are viewing Radeon ProRender Material Nodes. You can tell since the material toggle is enabled.



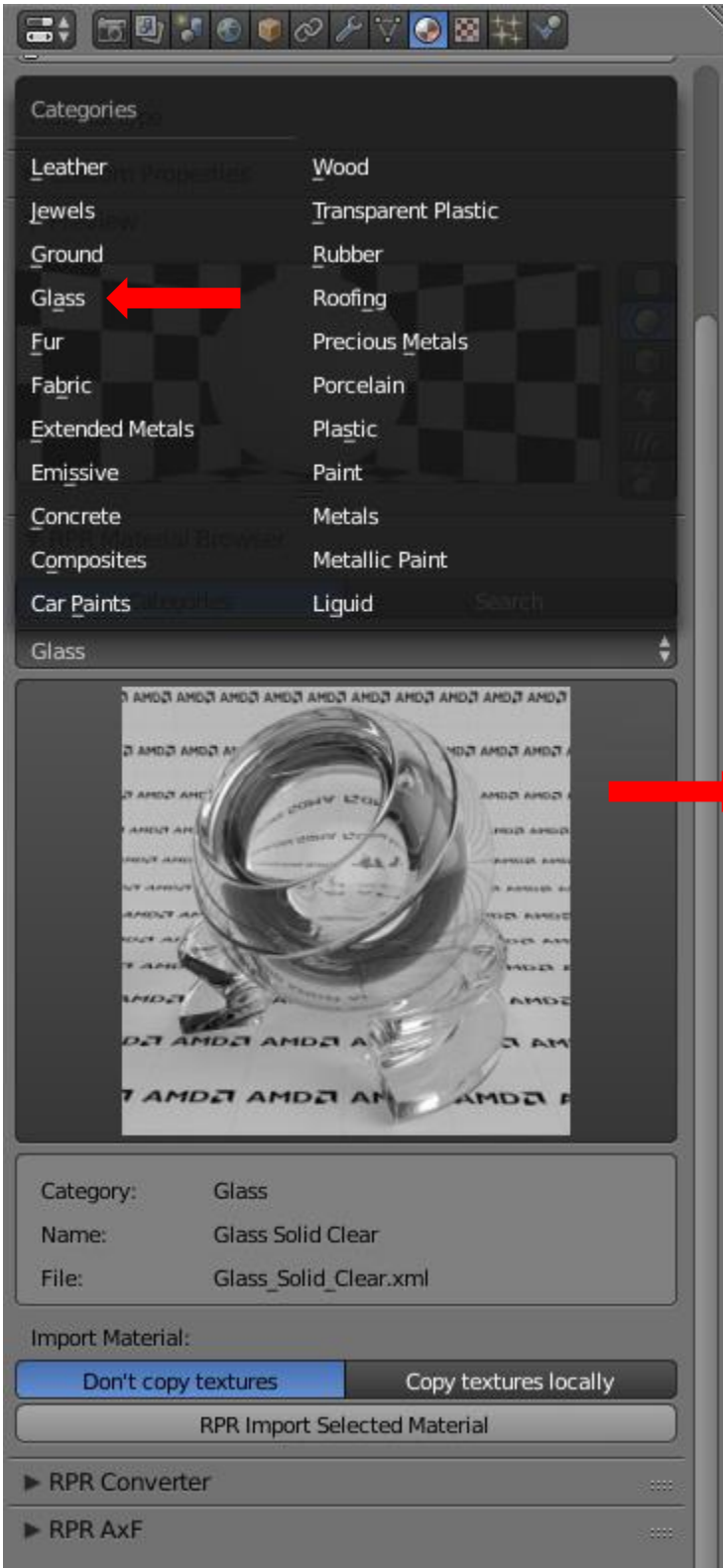
Here you have access to the various Radeon ProRender Material Shaders.



For example, to set a glass material for the object using the **RPR Material Browser**.



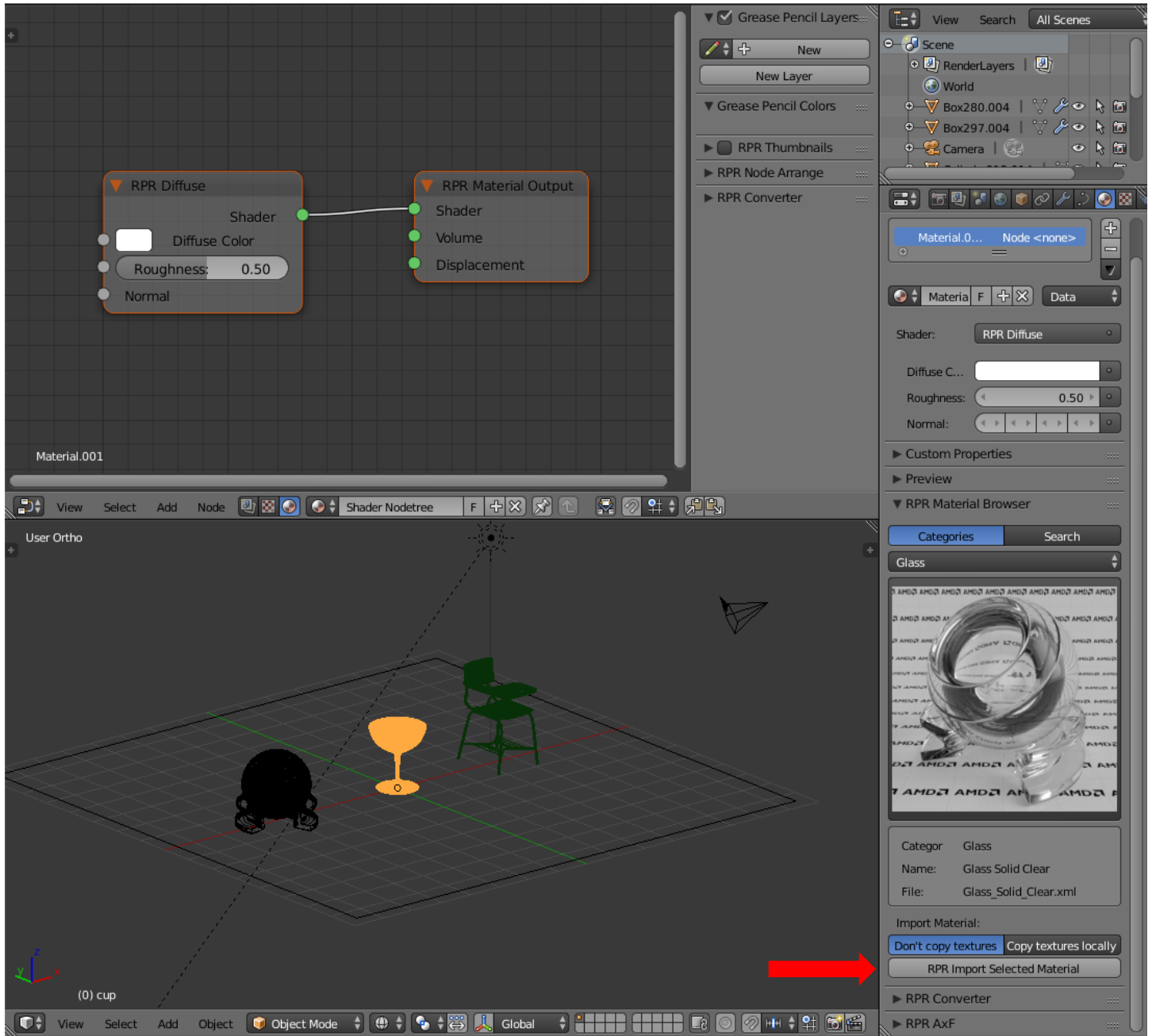
Go to the **RPR Material Browser**. In the Materials region, select the glass materials OR click on the picture to display a visual picture of all the materials.



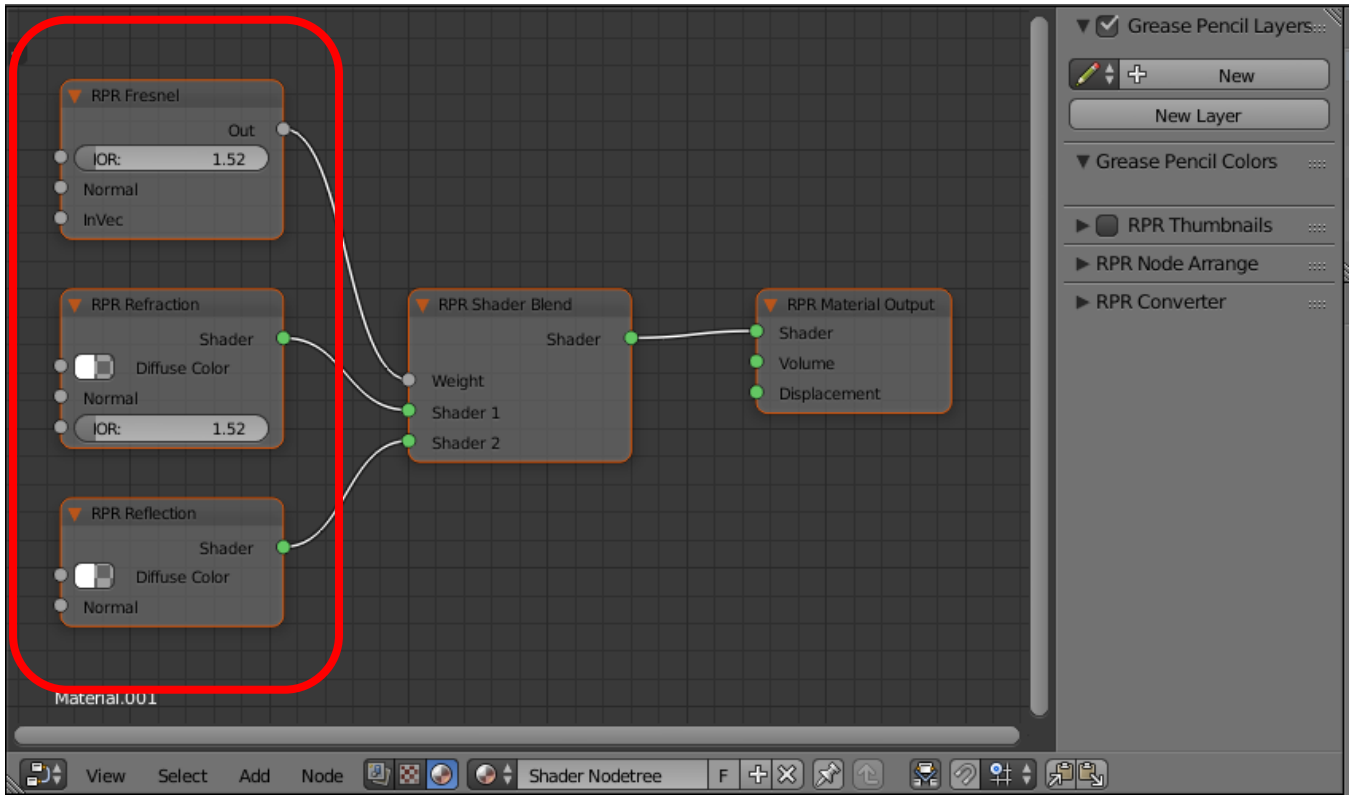
After selecting a material, click on **RPR Import Selected Material** to import material into the Node Editor.



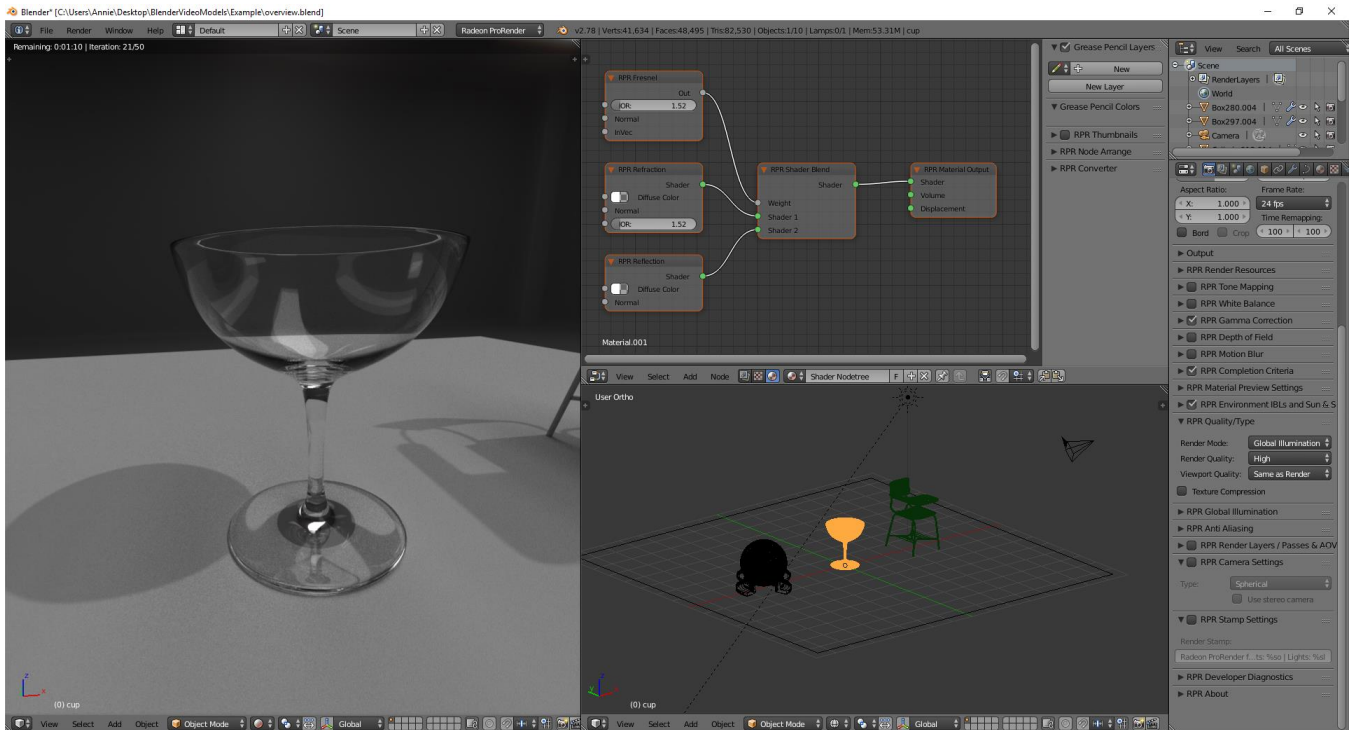
**Note:** You have to click **RPR Import Selected Material** every time to update the Node Editor. Else the material will not update.



After importing, the Node Editor will automatically connect the **RPR Shaders** to the **RPR Material Output** that will result in a glass material for the object.



The glass material is immediately rendered in the viewport.

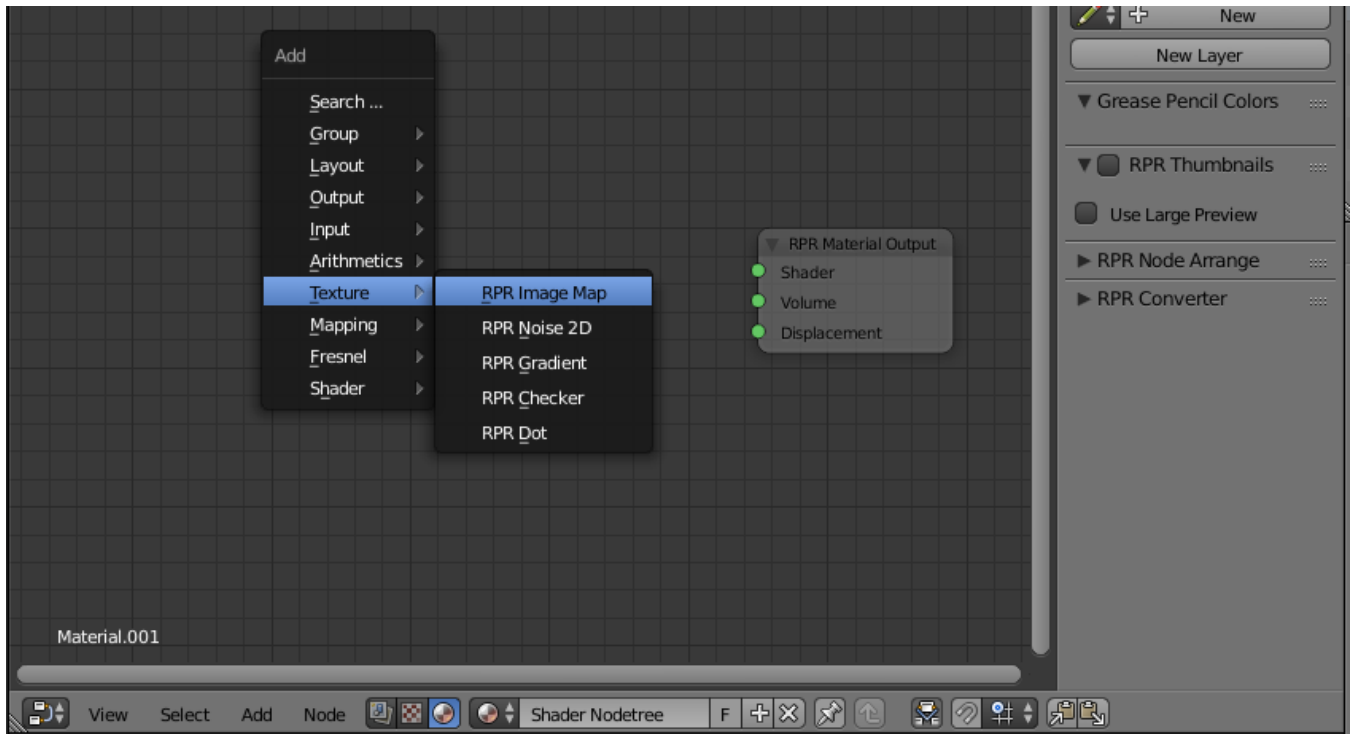


## Textures

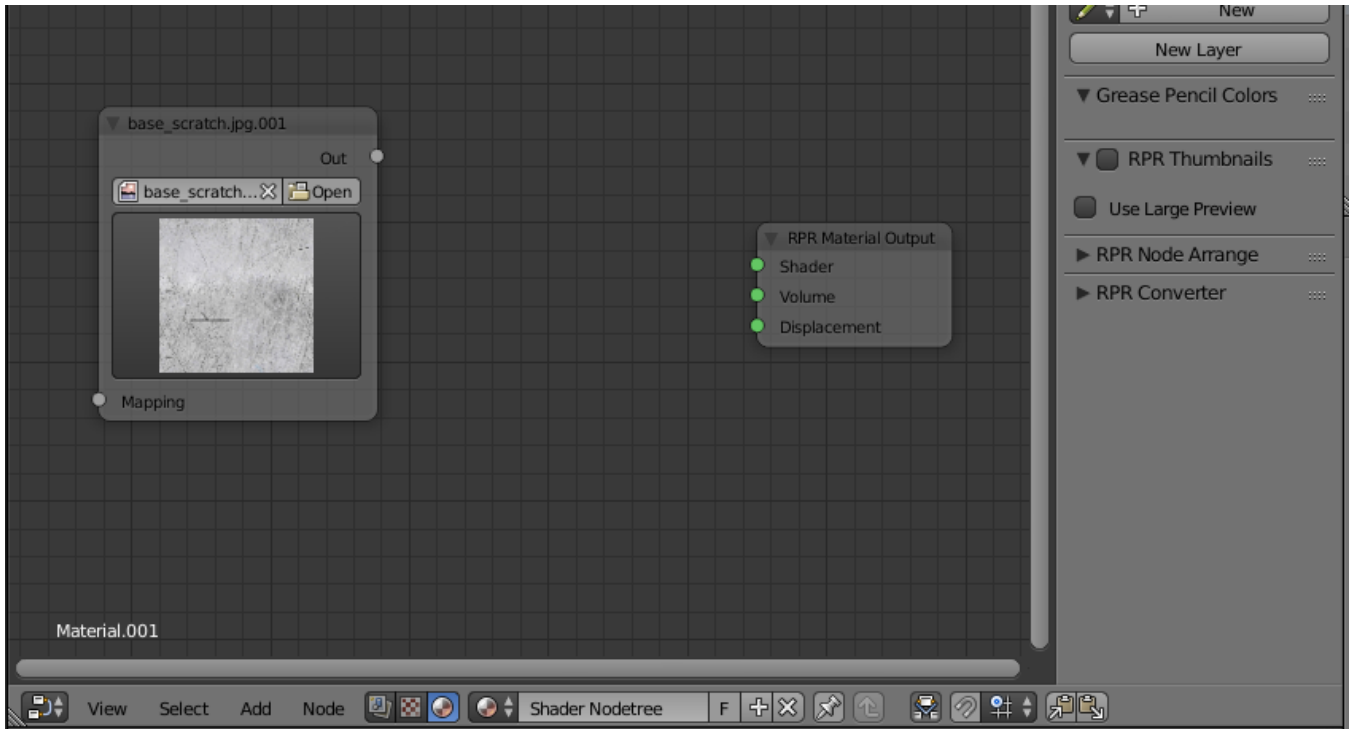
You can import a picture to simulate a material or texture. In the Node Editor, click **Add (Shift + A) > Texture > RPR Image Map**.



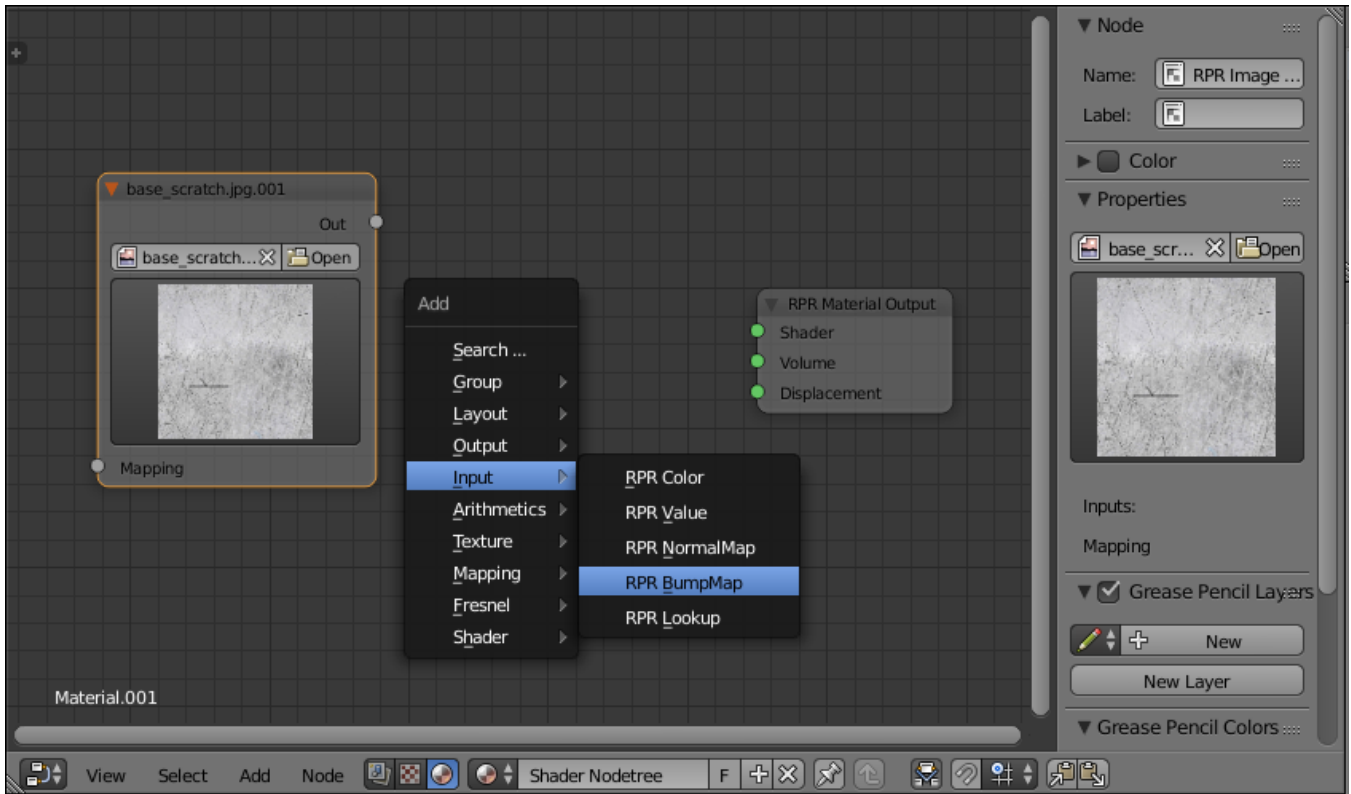
**Tip: RPR Image Map** nodes have a “**Texture Gamma**” setting as of **v1.6**. Normally, set this to “**sRGB**” for color maps (such as diffuse color) and leave as “**linear**” for black and white values, normal maps, etc..



Import an image.

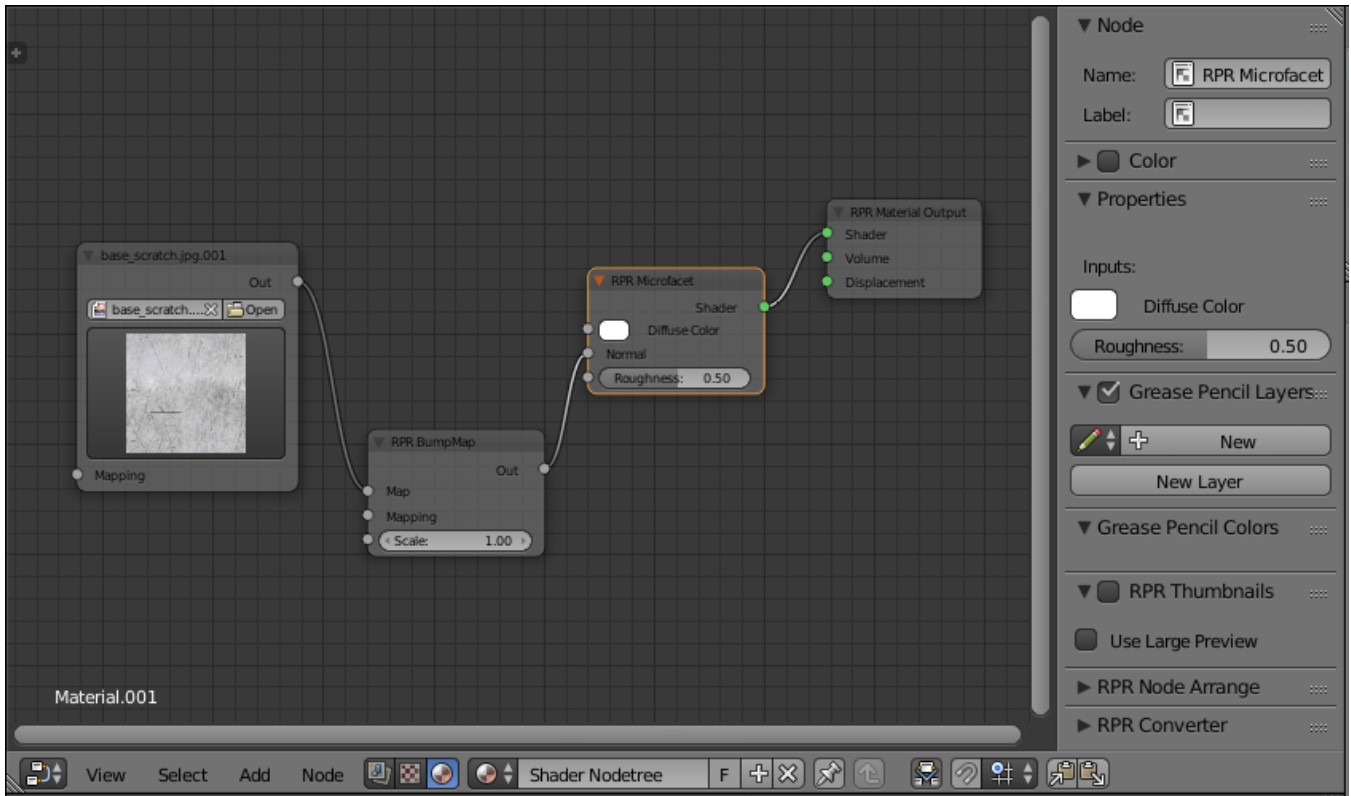


Click **Add (Shift + A) > Input > RPR BumpMap**.

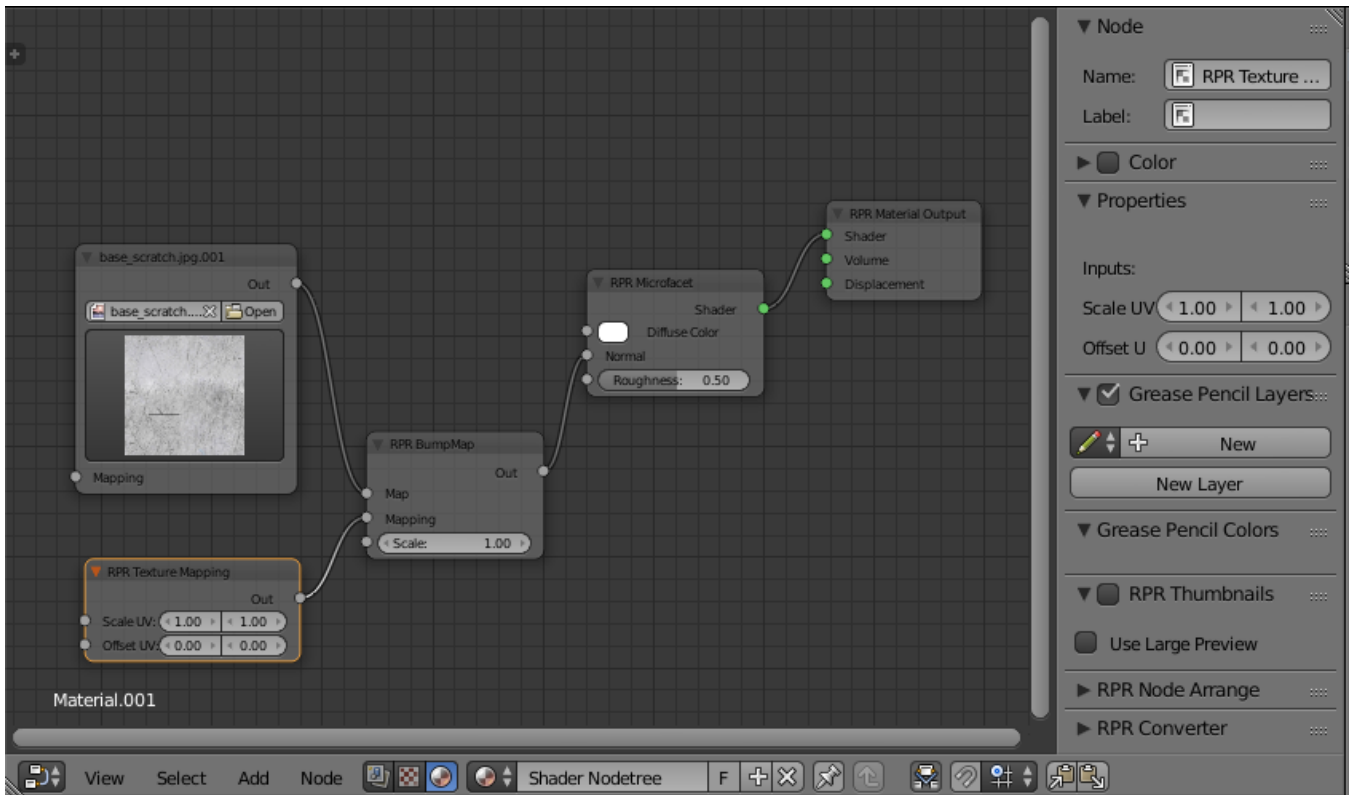




Connect to original Macrofacet Shader.



Add texture mapping.





# Radeon ProRender plug-in for Blender

**User Guide v2.4**

Written by: Annie Yu

05/09/2018

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