Bokeh Lens Shader by Ash Aiad
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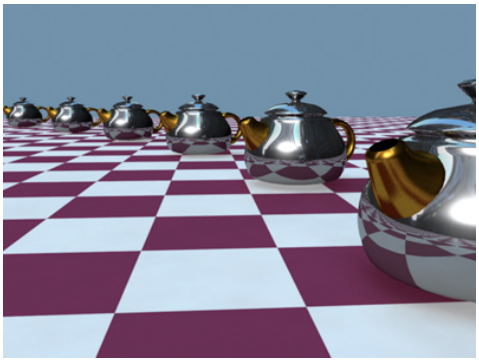
Bokeh is a Japanese word for "blurred or fuzzy" (暈け)

This is a real life phenomenon that occurs in photography where the light sources in an out of focus area of an image. Different lens Bokeh produces different aesthetic qualities in out of focus backgrounds, which are often used to reduce distractions and emphasize the primary subject. For some real life examples, please visit the Bokeh page on the Wikipedia.

We can simulate the same effect in Maya using the Bokeh Lens Shader in mental ray. This is the render without using Bokeh as our starting point.



Before

After

Once mental ray Bokeh Lens Shader is being applied to Maya's Camera, it will produce the following effect, and much more!

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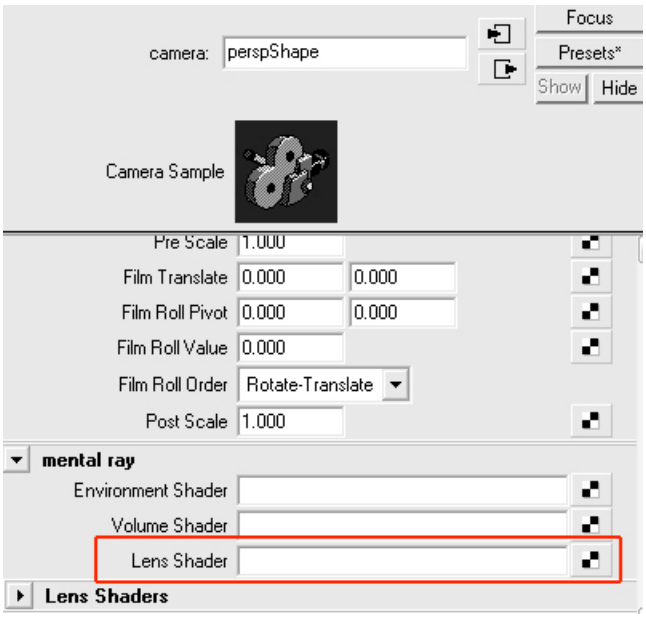
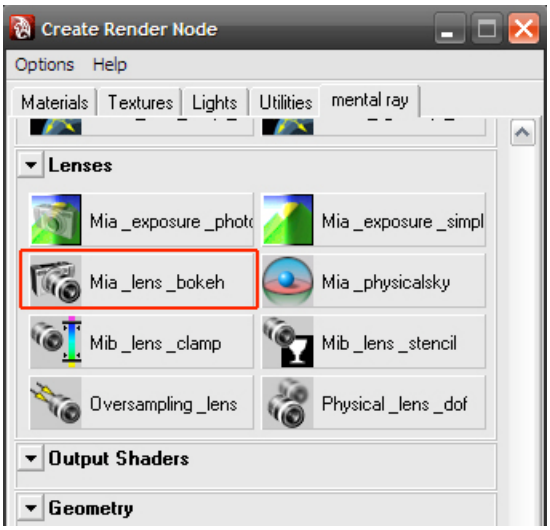
How to simulate Bokeh Lens effect in Maya

Assign Lens shader to Camera

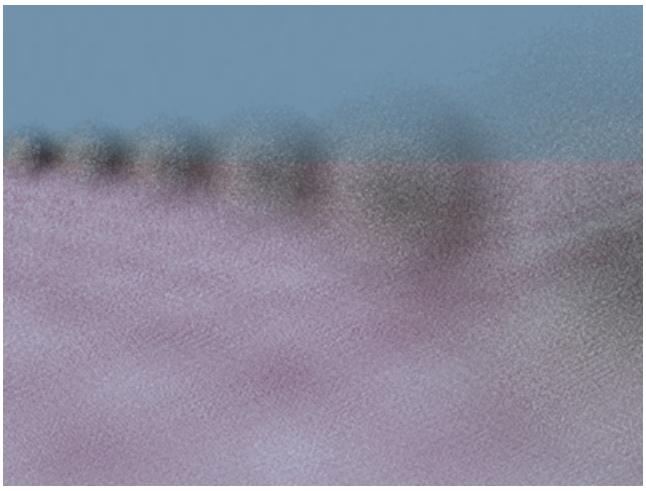
We start by selecting the camera of choice, and under the attribute editor of that camera, click on “Lens Shader” to assign a mental ray Lens Shader.



Under “Create Render Node” dialog, open the “Lenses” vertical tab and locate the mia_lens_bokeh Shader.

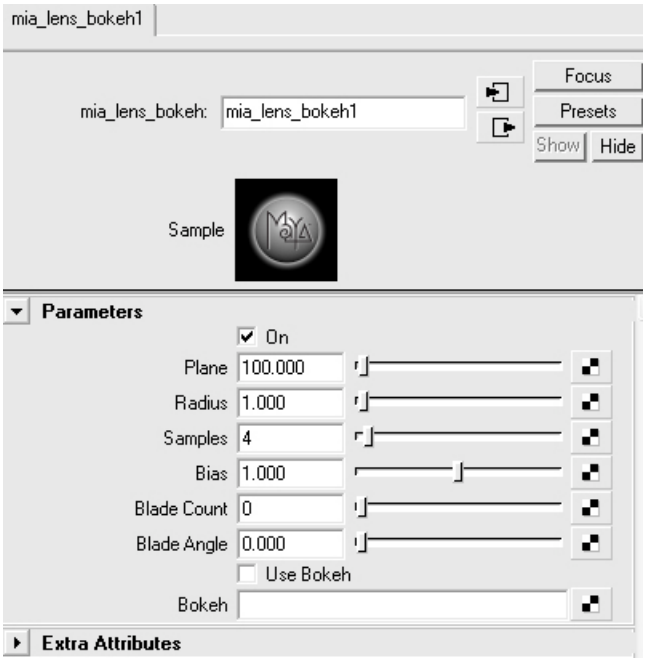


By default the Bokeh effect will look something like this



Note: The Shader parameters rely on the scene size, therefore results will vary from one file to the other.

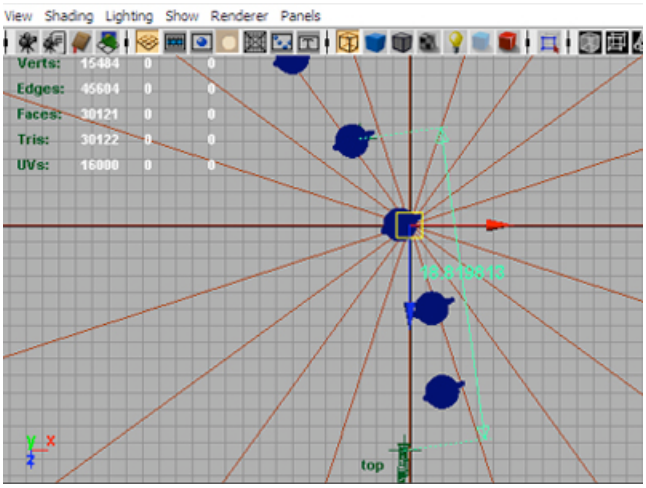
Understanding Bokeh Lens shader



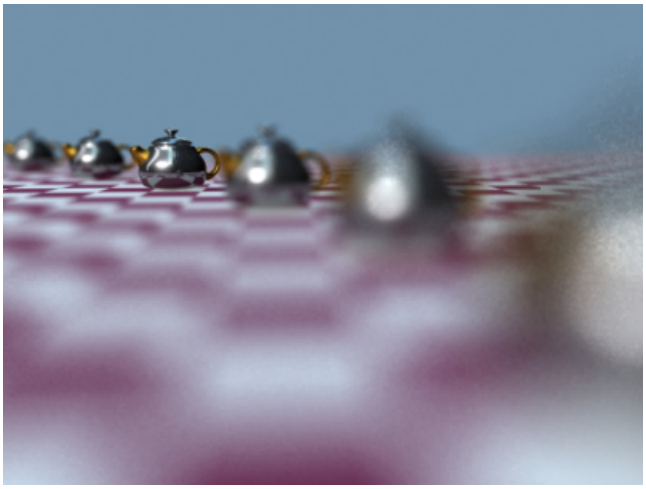
On:
This is a toggle on/off switch to disable the Shader if needed. Default is on. You can apply an render layer override to disable the shader for specific render layers, for instance.

Plane:
Is the distance to the focal plane from the camera, i.e. the point of interest. This point will be in focus and the rest will be out of focus.

To get the proper Plane value, we will use the measuring tool to give us that distance from the camera to the point of interest.



You can also use the camera Near/Far Clipping plane as a method to determine the distance required.

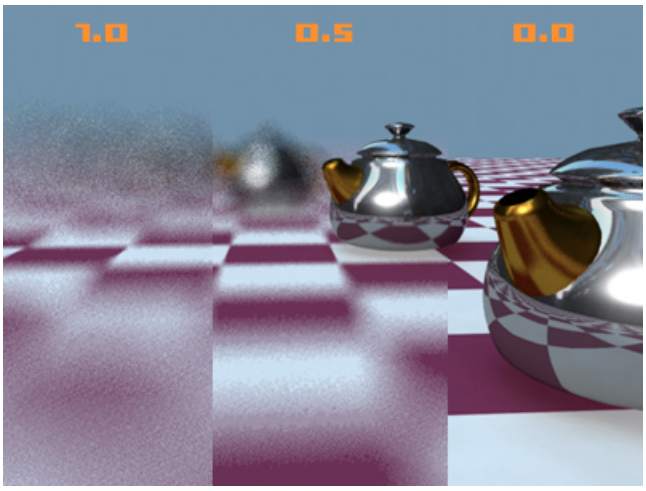


With a plane value at 18.8

With a plane value at 8.7

Radius:

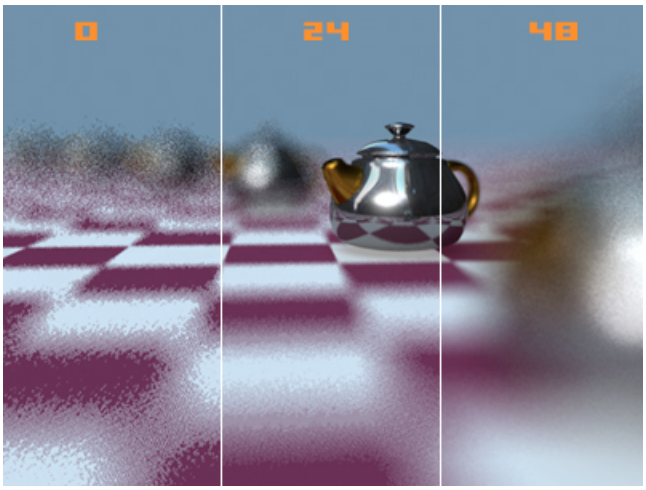
This is the radius of confusion. This is an actual measurement in scene units. A value of 0 will result with No Bokeh. The higher the value, the further away the Blur will accrue.



From left to right, Radius at 1.0, 0.5 and 0.0

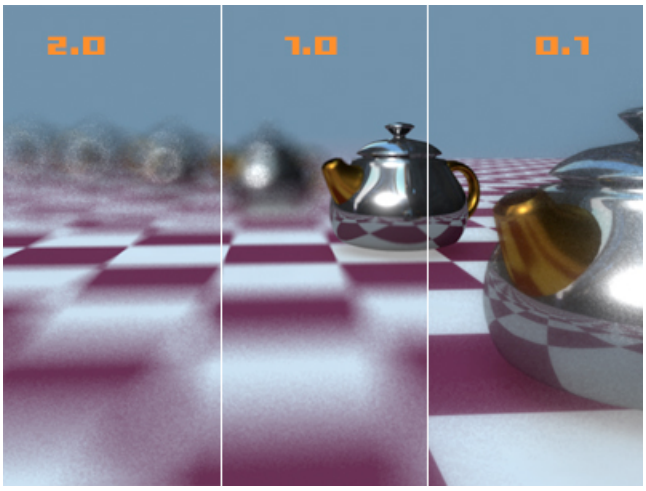
Samples:

The more samples we have the better the quality of the “blur”, however that comes with the expense of render time.

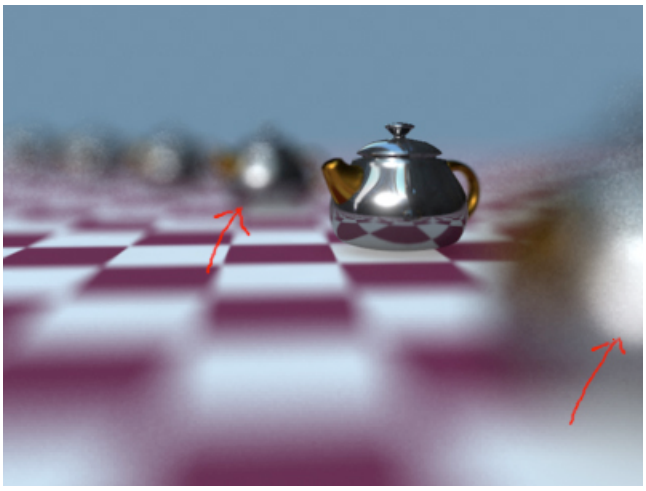


From left to right: Sample at 0, 24 and 48

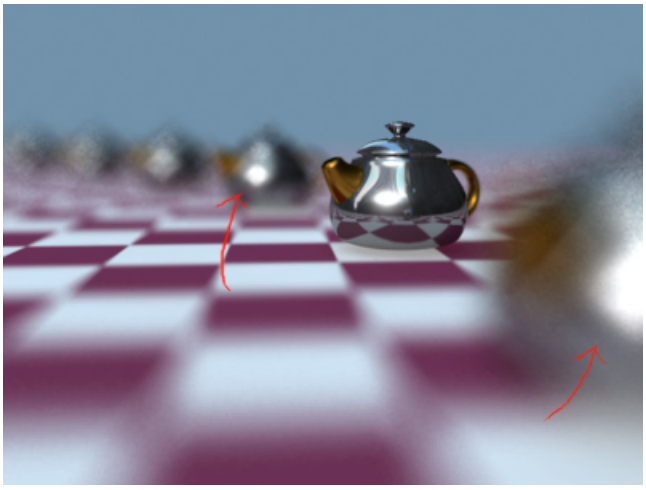
Bias:
Lower values push the sample probability towards the center, creating a "softer" looking DOF effect with a more "misty" look. Higher values push the sample probability towards the edge, creating a "harder" looking DOF where bright spots actually resolve as small circles.



Blade Count:
This defines how many "edges" the "circle" of confusion has. A zero value makes it a perfect circle. Notice the shape of the highlight in the blurred area of the rendered image.



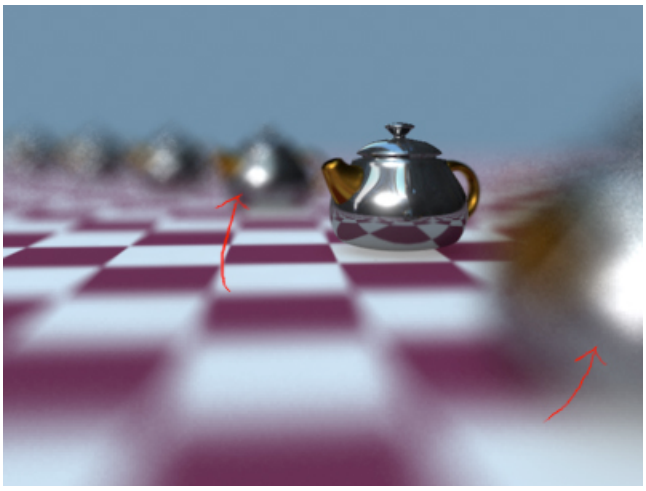
With bias at 0, notice how the blurred highlights are perfect circle.



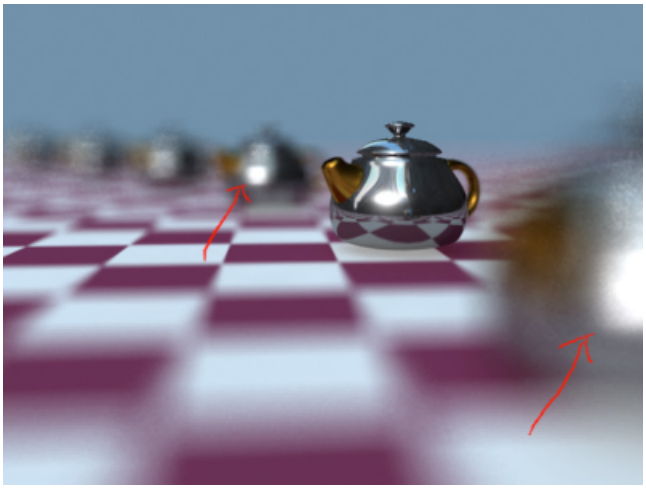
With bias at 4, notice the 4 corners in the blurred highlights.

Blade Angle:

One can also set the angle with the blade_angle parameter, which is expressed from 0.0 to 1.0 where 0.0 is zero degrees and 1.0 is 360 degrees. The effect will be more noticeable when you have hard corner highlight (for example, a value 4 or greater).



With Blade Angle at 0 (0 degree)



With Blade Angle at 0.25 (90 degrees).

Advanced Bokeh Effect

“Use Bokeh” and “Bokeh map”

This option allows using an image as Bokeh map. When this option is used, the parameters “bias”, “blade count” and “blade angle” have no effect. The map defines the shape of the DOF filter kernel, so a filled white circle on a black background is equivalent to the standard blur. Generally, one need more samples to accurately "resolve" a custom Bokeh map.

Note: The size of this image map does not contribute to the quality of the render.

The following rendered images demonstrate different custom Bokeh maps.