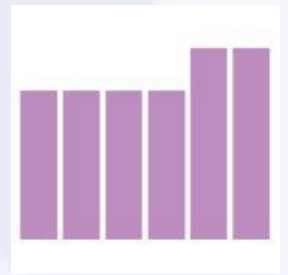


# Comparing Global Illumination (GI) Renderers

Jan Walter – The Mill (London, UK)



# GI Renderers

- Radiance (<http://radsite.lbl.gov/radiance/>)
- Arnold (<http://www.solidangle.com/>)
- Cycles Render Engine
- Others: Maxwell, Indigo, Luxrender, V-Ray, mental ray, Octane Render, iray, Mantra, Povray, Yafaray, ...
- [http://www.janwalter.com/RadianceVsYouNameIt/radiance\\_vs\\_younameit.html](http://www.janwalter.com/RadianceVsYouNameIt/radiance_vs_younameit.html)
- [https://bitbucket.org/wahn/radiance\\_vs\\_younameit/wiki/Home](https://bitbucket.org/wahn/radiance_vs_younameit/wiki/Home)
- [https://github.com/wahn/export\\_multi/wiki](https://github.com/wahn/export_multi/wiki)
- <https://bitbucket.org/wahn/blender-add-ons/wiki/Home>

# Let's Share ...

- **Forum** (share your own experience):  
<http://www.janwalter.com/renderforum/>
- **Scene descriptions** (provide scenes to tweak):  
[https://bitbucket.org/wahn/radiance\\_vs\\_younameit](https://bitbucket.org/wahn/radiance_vs_younameit)  
[https://github.com/wahn/export\\_multi](https://github.com/wahn/export_multi)
- **Source Code** (e.g. Blender to learn from):  
<https://bitbucket.org/wahn/blender-add-ons>
- **Pictures** (host them yourself and link in forum):  
[http://www.janwalter.com/RadianceVsYouNameIt/radiance\\_vs\\_younameit.html](http://www.janwalter.com/RadianceVsYouNameIt/radiance_vs_younameit.html)
- **Publications** (publish yourself and link to it):  
[http://www.janwalter.com/Download/PDF/radiance\\_vs\\_younameit.pdf](http://www.janwalter.com/Download/PDF/radiance_vs_younameit.pdf)

# The Forum

- **Browse:** Just read it from time to time
- **Register:** In case you want to participate

[Home](#) [Help](#) [Search](#) [Calendar](#) [Login](#) [Register](#)

- **Login:** Required to post

Welcome, **Guest**. Please login or register.

Forever

Login with username, password and session length

- **Post:** New topics or reply to existing ones

[NEW TOPIC](#)

[NEW POLL](#)

[NOTIFY](#)

[MARK READ](#)

[REPLY](#)

[NOTIFY](#)

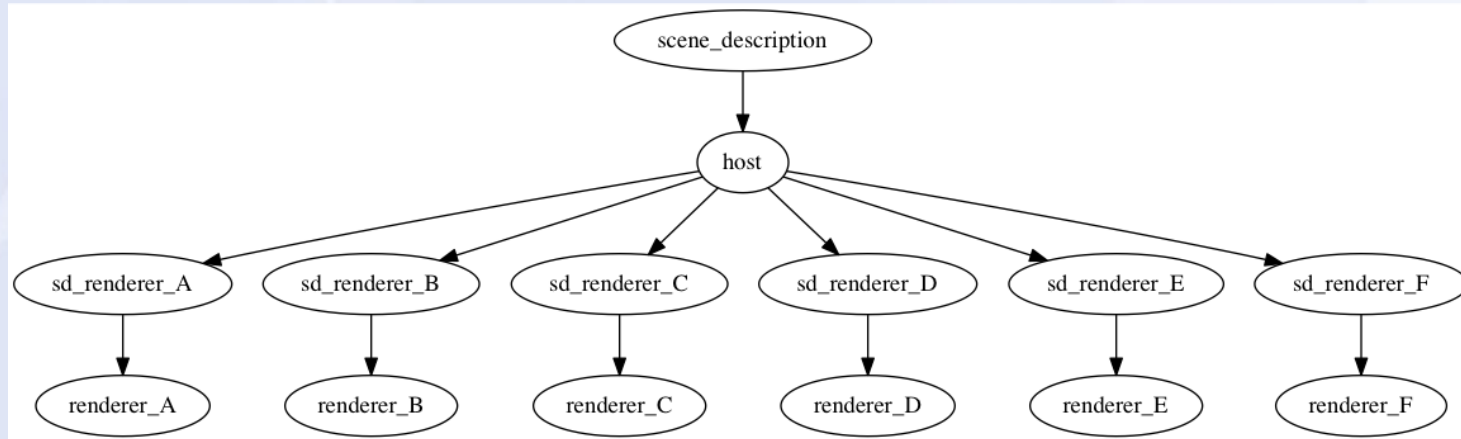
[MARK UNREAD](#)

[SEND THIS TOPIC](#)

[PRINT](#)

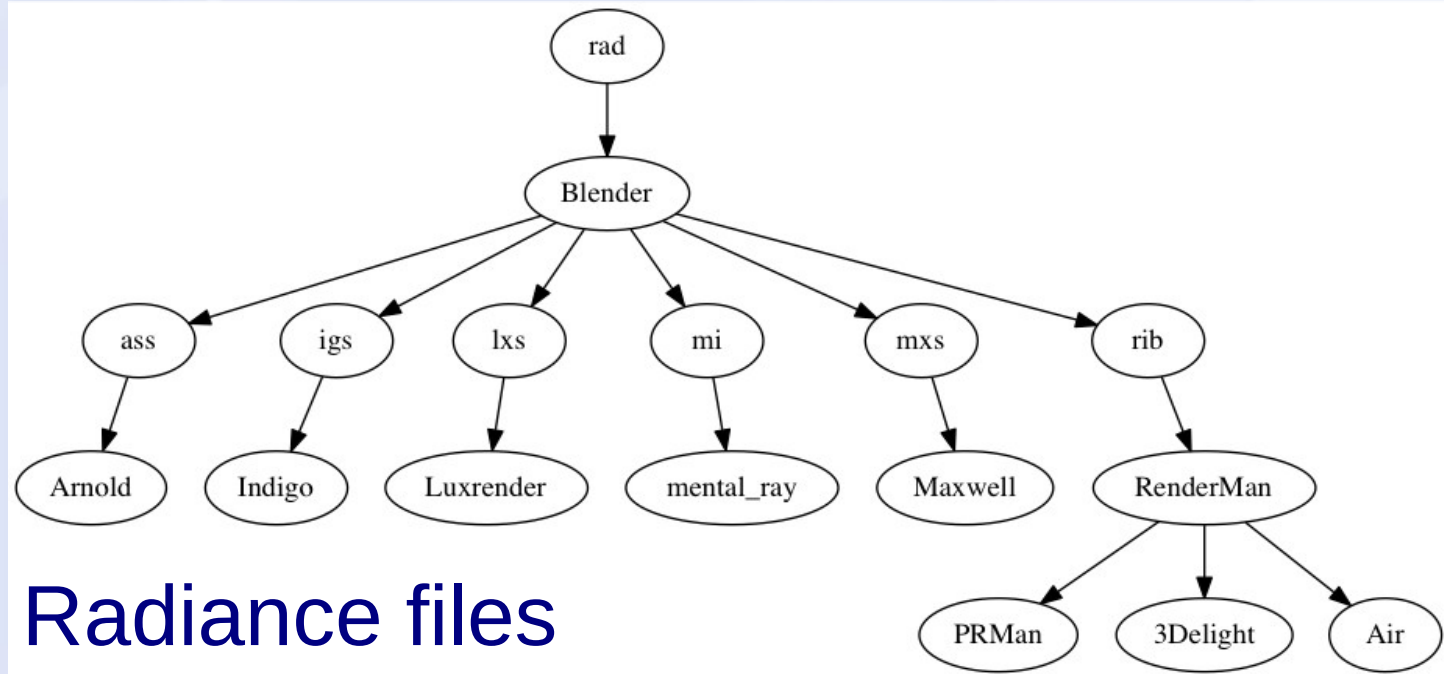
- **New category?** E.g. a new renderer? Ask!

# Main Idea for Exporter



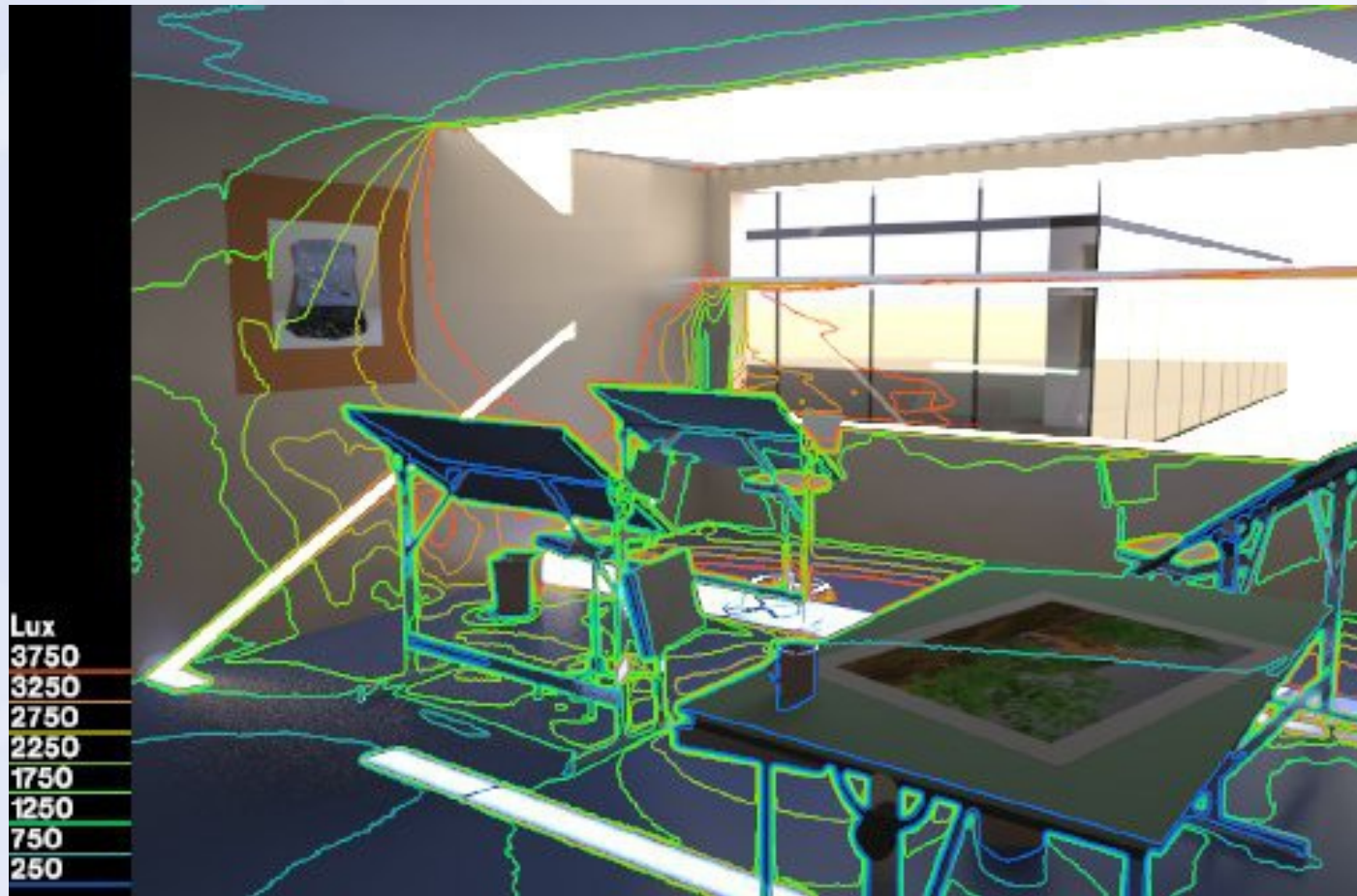
- Read scene description
- Keep data in host without losing settings
- Export to several scene descriptions
- Render with different renderers

# Decisions Made So Far



- Use Radiance files
- Blender as 'host' so source code is free
- .ass, .igs, .lxs, .mi, .mxs, .rib
- Arnold, Indigo, Luxrender, mental ray, Maxwell, RenderMan compliant

# Radiance

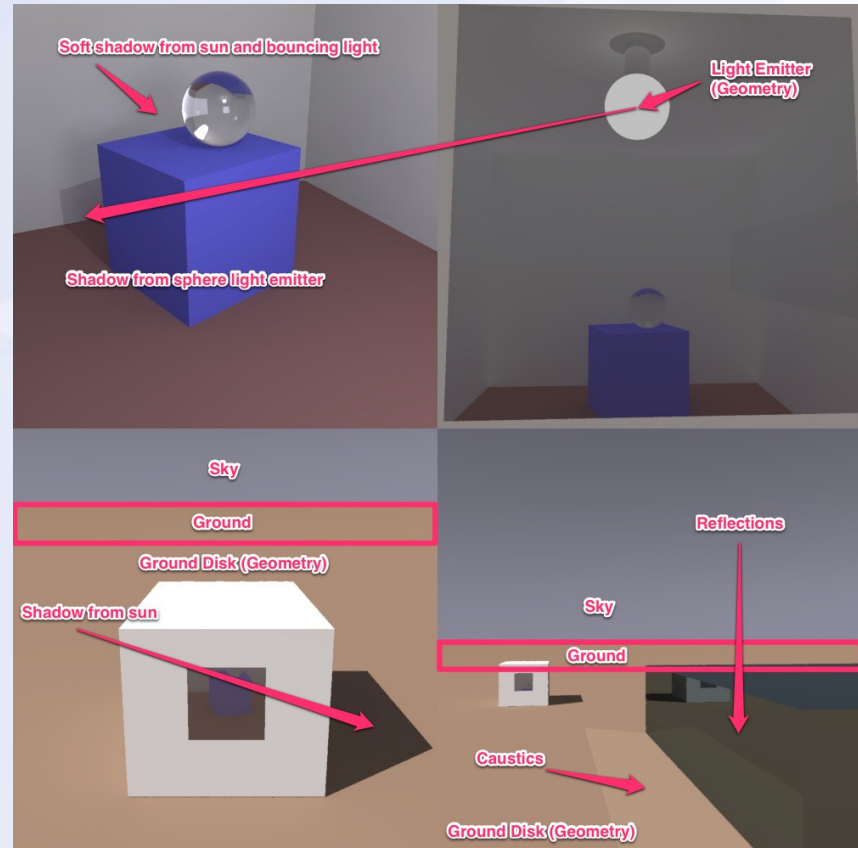


# Why Radiance?

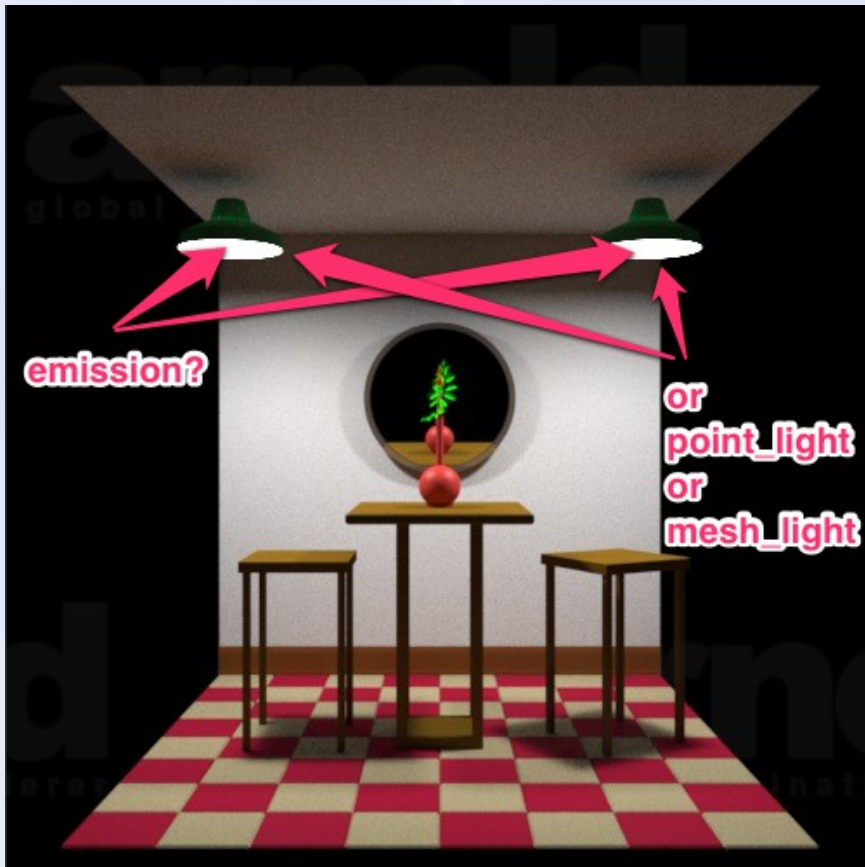
- We owe Radiance a lot: E.g. HDR
- Results may be displayed as color images, numerical values and contour plots.
- Used by **architects** and **engineers** to **predict illumination**, visual quality and appearance of innovative design spaces, and by **researchers** to evaluate **new lighting and daylighting technologies**.



# Simple Room



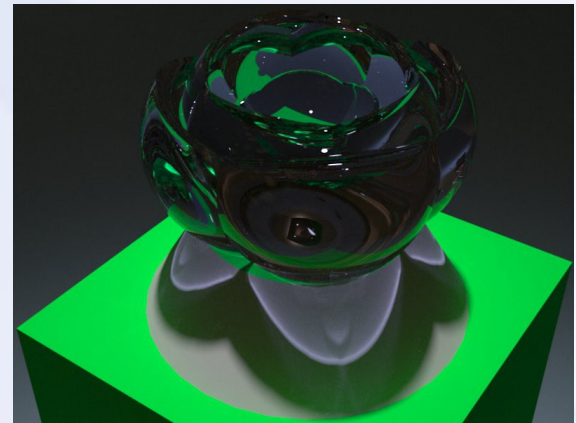
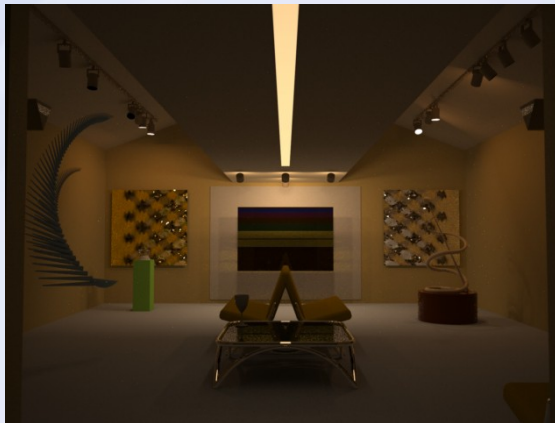
# Cafe Scene



- Blender Python Console:
- `bpy.ops.export_scene.ass(filepath = "/.../untitled.ass", opt_use_global_illum = True, ...)`
- Use Anti-Aliasing settings for higher sampling



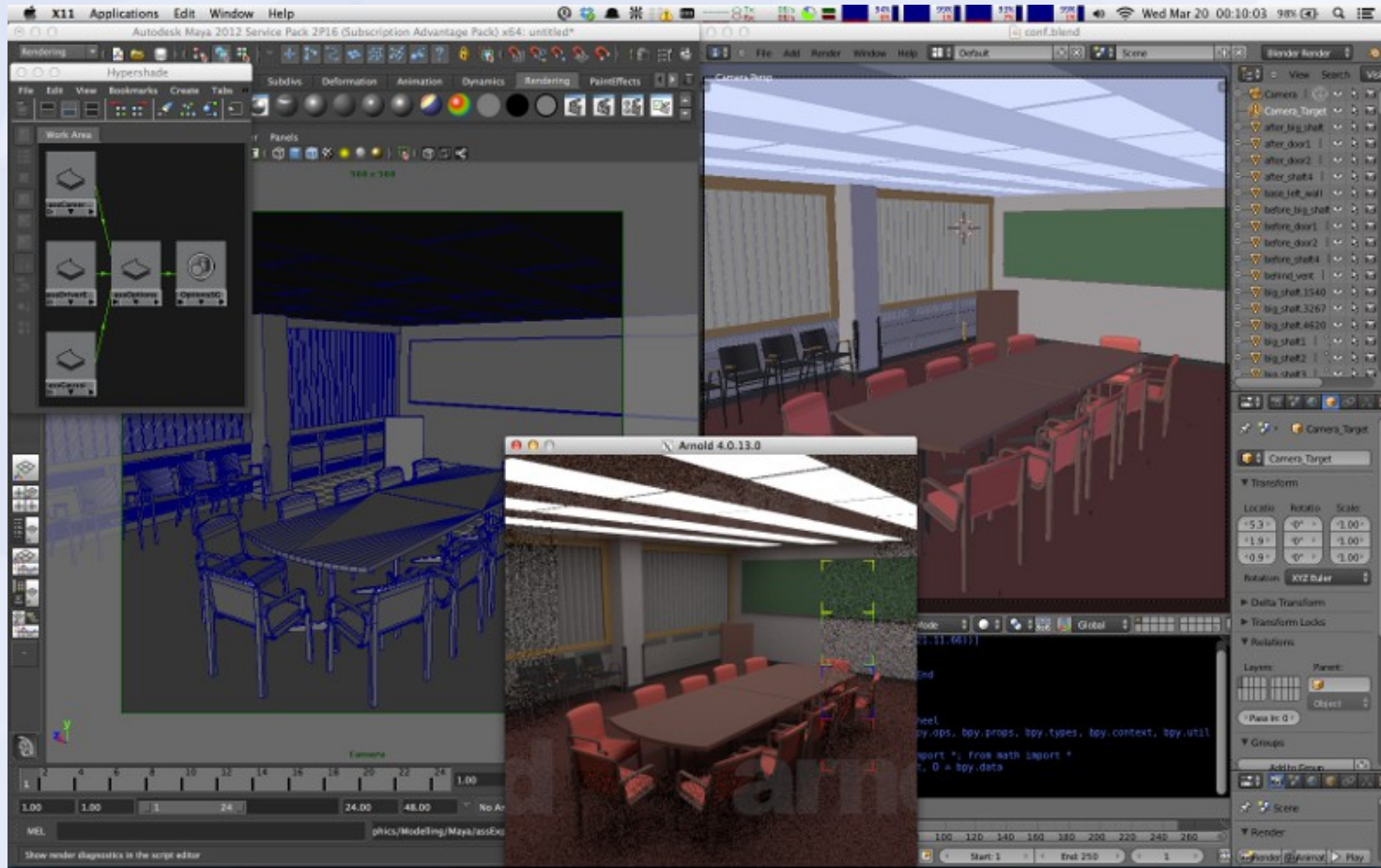
# Gallery Scene



# Commercial Packages

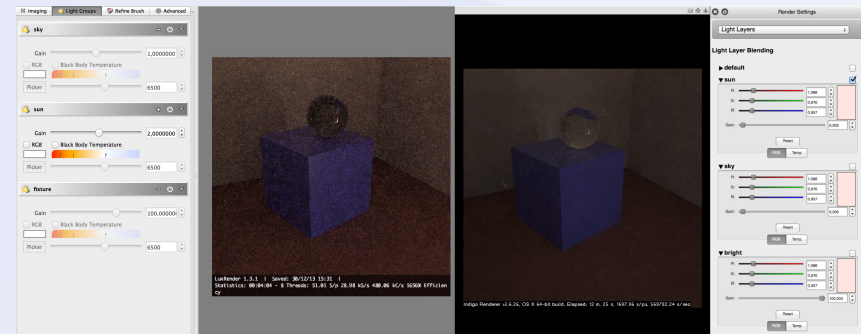
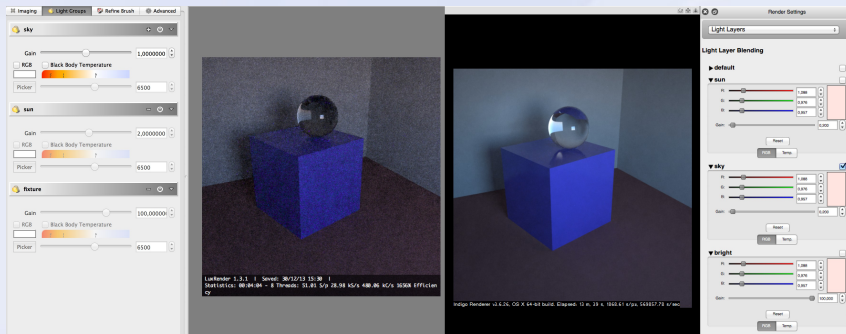
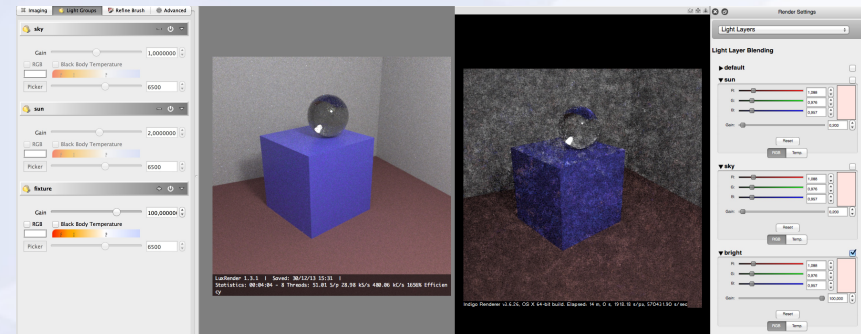


# Commercial Packages

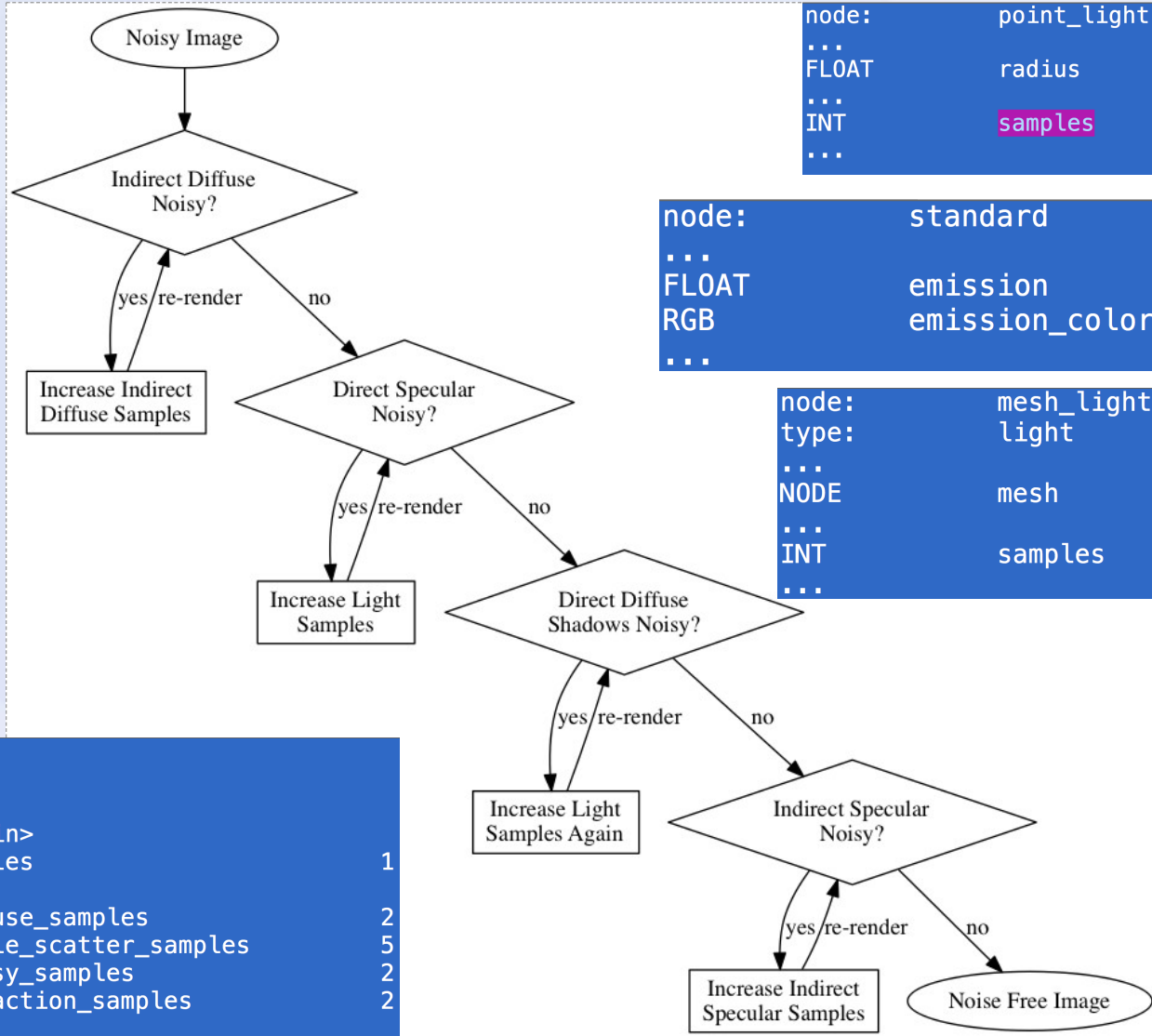


# Light Groups

- Right: Light emitter
- Below: Sky only
- Bottom right: Sun only



# Arnold AOV Noise Reduction



```

node: point_light
...
FLOAT radius
...
INT samples
...
  
```

```

node: standard
...
FLOAT RGB
...
emission
emission_color
...
  
```

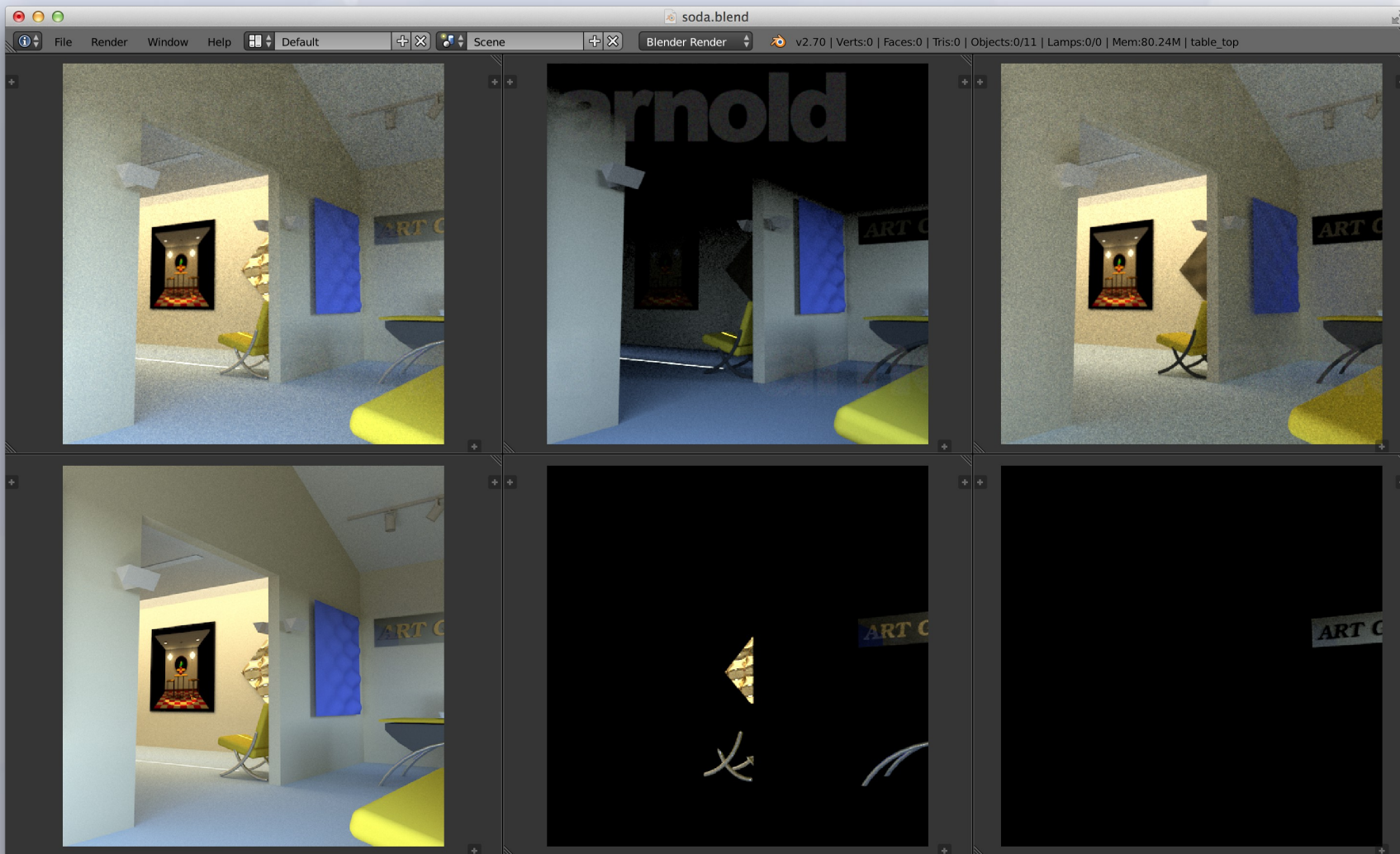
```

node: mesh_light
type: light
...
NODE mesh
...
INT samples
...
  
```

```

node: options
...
parameters: 105
filename: <built-in>
INT AA_samples 1
...
INT GI_diffuse_samples 2
INT GI_single_scatter_samples 5
INT GI_glossy_samples 2
INT GI_refraction_samples 2
...
  
```

# Arnold AOV Noise Reduction II





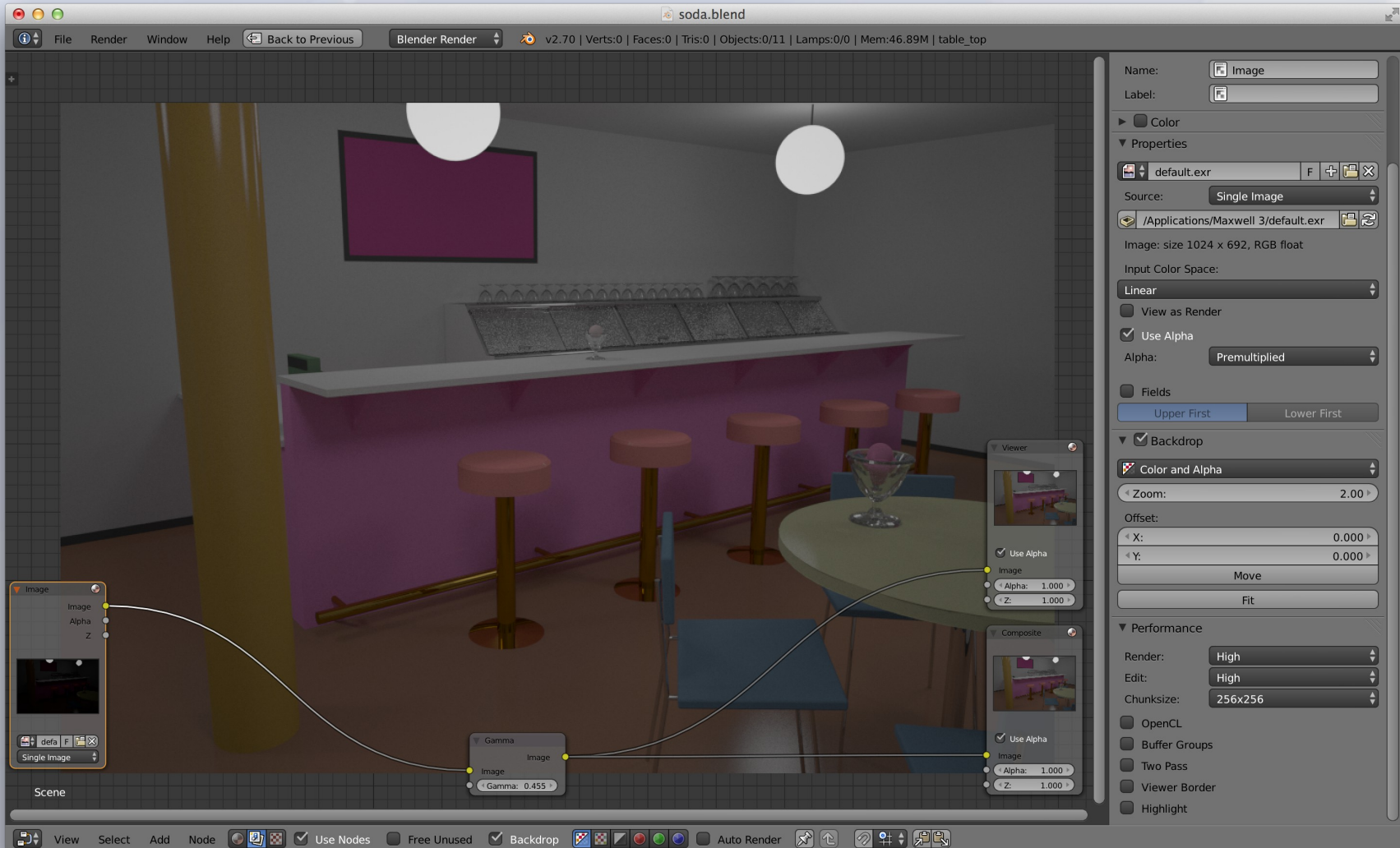
# Camera Settings

The image displays a collage of software screenshots related to camera settings, with red boxes and arrows highlighting specific values:

- LuxRender:** Shows the **Tone Mapping** panel with **Film ISO** set to 400,0, **Shutter** set to 20,000, and **F-stop** set to 5,6. A handwritten note **1/20** is next to the shutter value.
- Maxwell Studio:** Shows the **Attributes Panel** with **Target Distance** set to 147,874, **Roll** set to 0,000, **Lock Exposure** set to 0,050, and **F-stop** set to 5,600. The **Sensor** panel shows **ISO** set to 400.
- Blender:** Shows the **Properties Editor** for a camera with **Camera Type** set to **Thin-Lens Perspective**, **F-Stop** set to 7,99858, **Exposure (1/s)** set to 125,00, **Focal Length (mm)** set to 26,1050, **Sensor Width (mm)** set to 32,0, **Field of View** set to 63,00, **Autofocus** checked, and **Focal Distance (m)** set to 147,874.

Red arrows indicate the flow of information: from LuxRender's ISO and Shutter to Maxwell Studio's ISO and Lock Exposure; from LuxRender's F-stop to Maxwell Studio's F-stop; from Maxwell Studio's Target Distance to Blender's Focal Distance; and from Maxwell Studio's Roll to Blender's Roll.

# Gamma correction (MXS)



# Source Code

```
Terminal — emacs — 80x16
blender multi git emacs
class CommonExporterInterface:
    def __init__(self, name, options):...
    def prepareExport(self, scene, directory, name, mblur, light_counter):...
    def writeCamera(self, name, lens, angle, resolution, border, AA_samples,...
    def writeCone(self, name, transform, mat):...
    def writeCylinder(self, name, transform, mat):...
    def writeMesh(self, name, transform, info):...
    def writeNurbsSurface(self, name, transform, info):...
    def writePointLight(self, name, transform, info):...
    def writeRing(self, name, transform, mat):...
    def writeSphere(self, name, transform, mat):...
    def writeSpotLight(self, name, transform, info):...
    def writeSunLight(self, name, transform, info):...
    def finishExport(self):...
-uu-:---F1 export_multi.py 1% L93 (Python)-----

Terminal — emacs — 80x20
class Options:...
#####

class CommonExporterInterface:...
#####

class AssExporter(CommonExporterInterface):...
class IgsExporter(CommonExporterInterface):...
class LxsExporter(CommonExporterInterface):...
class MiExporter(CommonExporterInterface):...
class MxsExporter(CommonExporterInterface):...
class RibExporter(CommonExporterInterface):...
#####

class MultiExporter:...
#####

def save(operator, context, filepath = "",...
-uu-:---F1 export_multi.py Bot L4698 (Python)-----
```

# Future Plans - Ideas

- More renderers in unified exporter
- A unified exporter for a commercial app
- More (public) test scenes
- Radiance exporter (not just an importer)?
- Better set of materials (support for skin?)
- Animation support?
- Shading languages? OSL? MDL?
- **Cooperation** with you guys ...

# Links

- The Mill
- <http://themill.com>
- <http://www.facebook.com/MillChannel>
- Jan Walter
- <http://www.janwalter.com> **or** <http://www.janwalter.org>
- [.../RadianceVsYouNameIt/radiance\\_vs\\_younameit.html](.../RadianceVsYouNameIt/radiance_vs_younameit.html)
- [www.janwalter.com/Download/PDF/fmx\\_2014\\_slides.pdf](http://www.janwalter.com/Download/PDF/fmx_2014_slides.pdf)
- <http://www.janwalter.org/renderforum>
- <https://bitbucket.org/wahn/blender-add-ons/wiki/Home>

