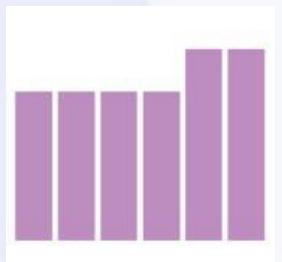


# **Comparing Global Illumination (GI) Renderers (using Blender)**

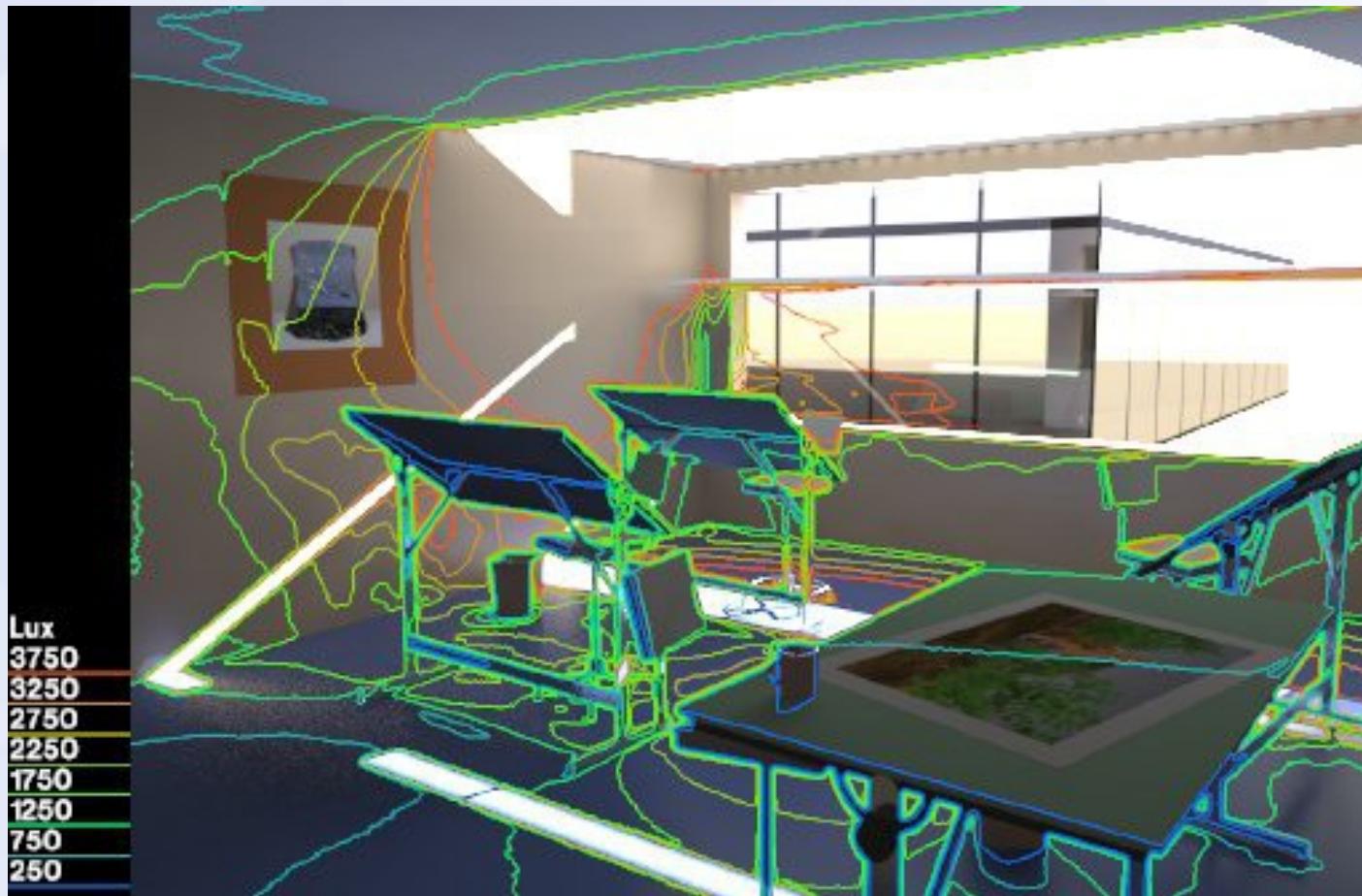
Jan Walter – The Mill (London, UK)



# 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://bitbucket.org/wahn/blender-add-ons/wiki/Home>

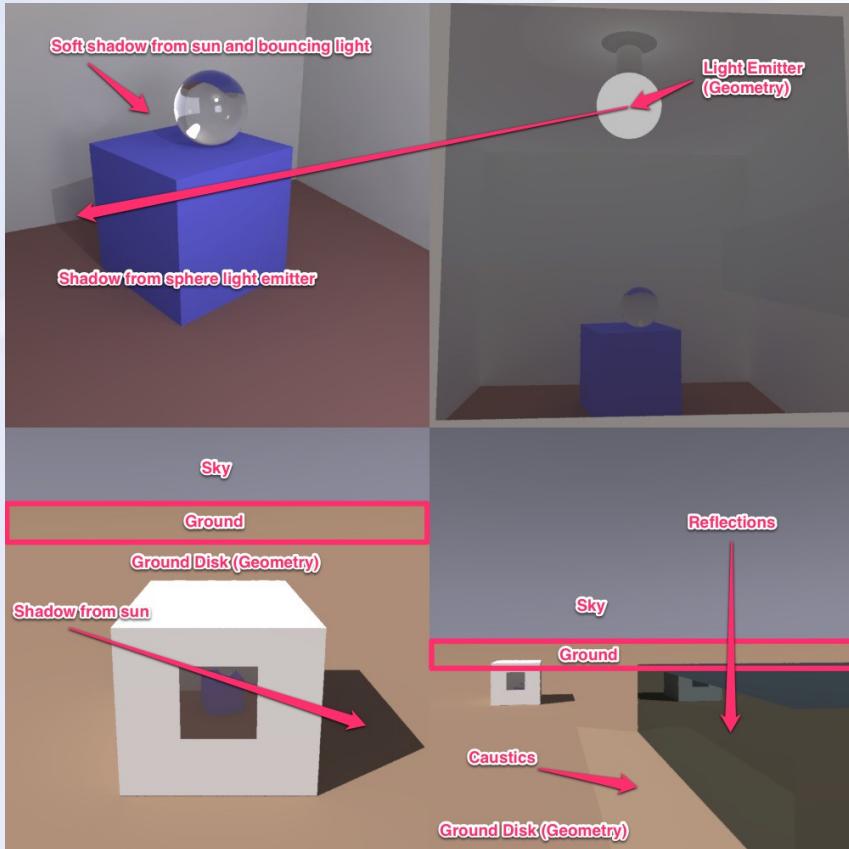
# Radiance



# Why Radiance?

- Analysis and visualization of lighting in design.
- 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**.

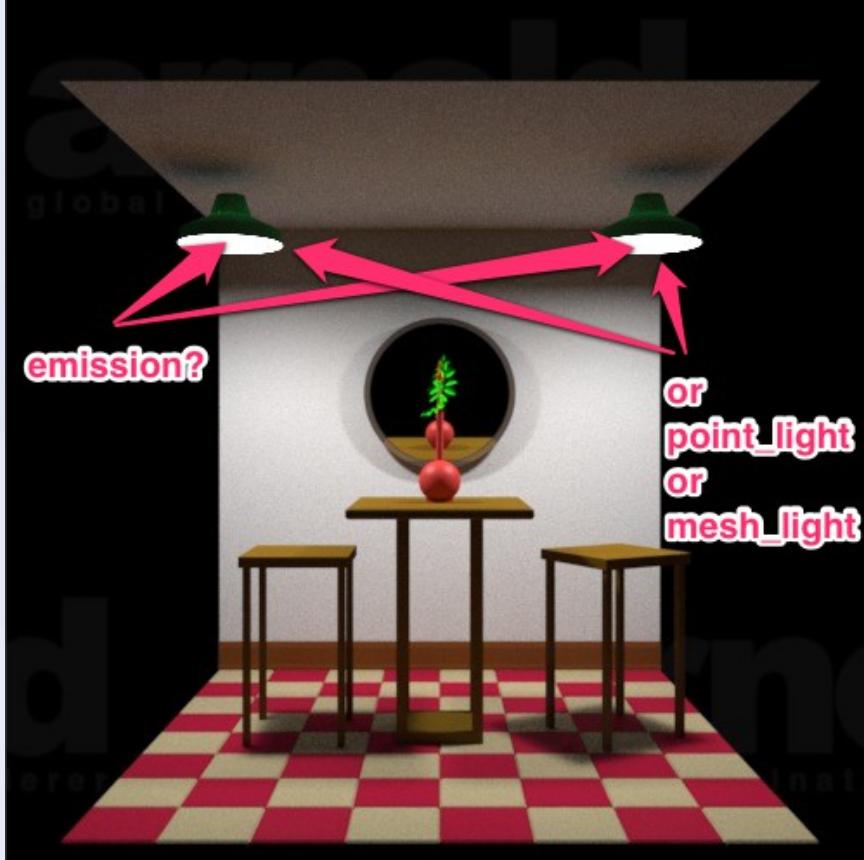
# Simple Room



# Arnold



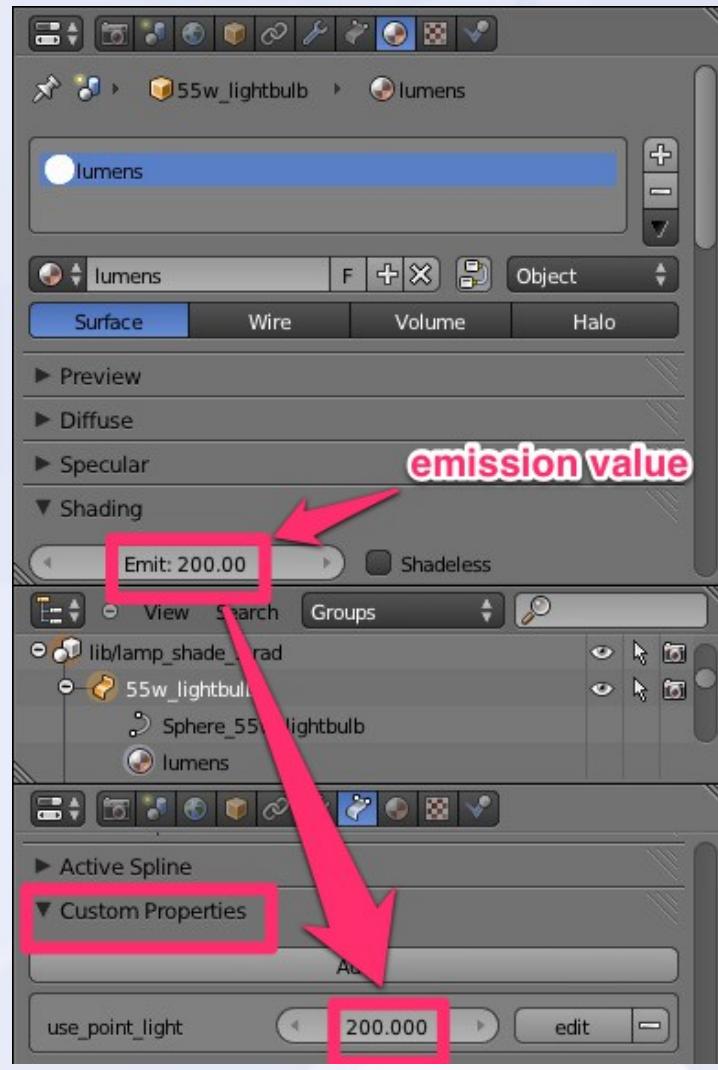
# Cafe Scene



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



# Emission vs. Point Lights



```
sphere
{
    name 55w_lightbulb
    radius 1
    matrix
        0.25 0 0 0
        0 0.25 0 0
        0 0 0.25 0
        3 0 7.25 1
    shader "lumens"
}

standard
{
    name lumens
    Kd 0
    specular_brdf "ward_duer"
    Phong_exponent 50
    emission 200
}
```

```
point_light
{
    name 55w_lightbulb
    radius 0.25
    matrix
        0.25 0 0 0
        0 0.25 0 0
        0 0 0.25 0
        3 0 7.25 1
    intensity 200
}

Ediff
Move around | Toggle features | Manipulate
p,DEL -previous diff | l -vert/horiz split | a/b -copy A/B's region to B/A
n,SPC -next diff | h -highlighting | r x -restore buf X's old diff
j -jump to diff | @ -auto-refinement | * -refine current region
gX -goto X's point | ## -ignore whitespace | ! -update diff regions
c-l -recenter | #c -ignore case
v/V -scroll up/dn | #f/#h -focus/hide regions | wX -save buf X
</> -scroll lt/rt | X -read-only in buf X | wd -save diff output
~ -swap variants | m -wide display |
```

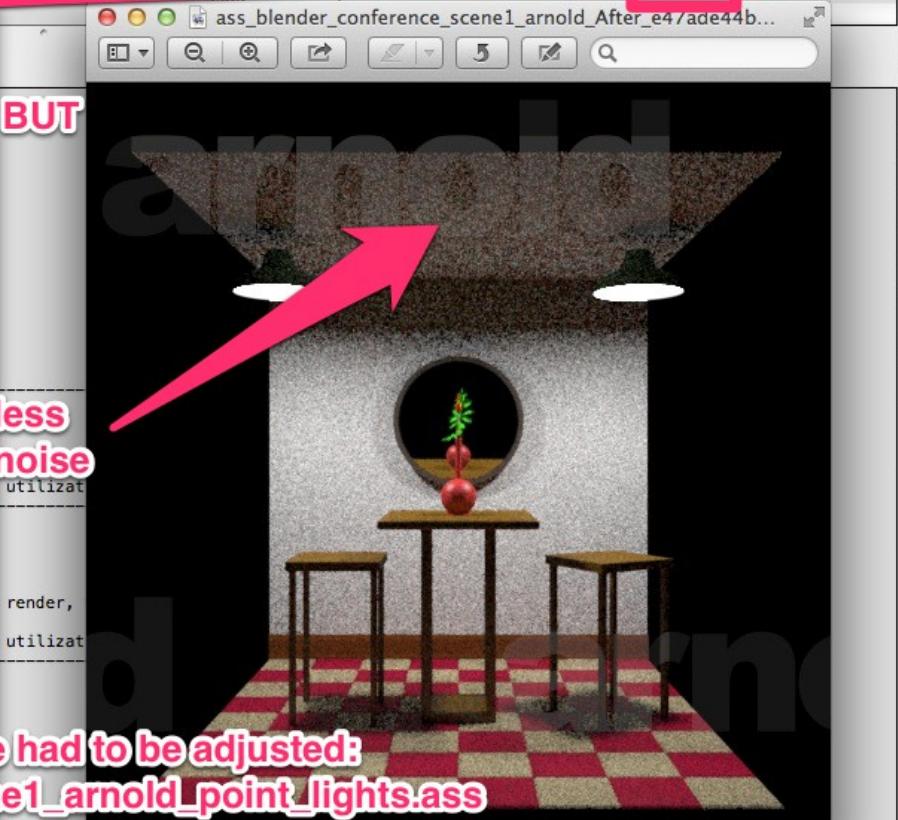
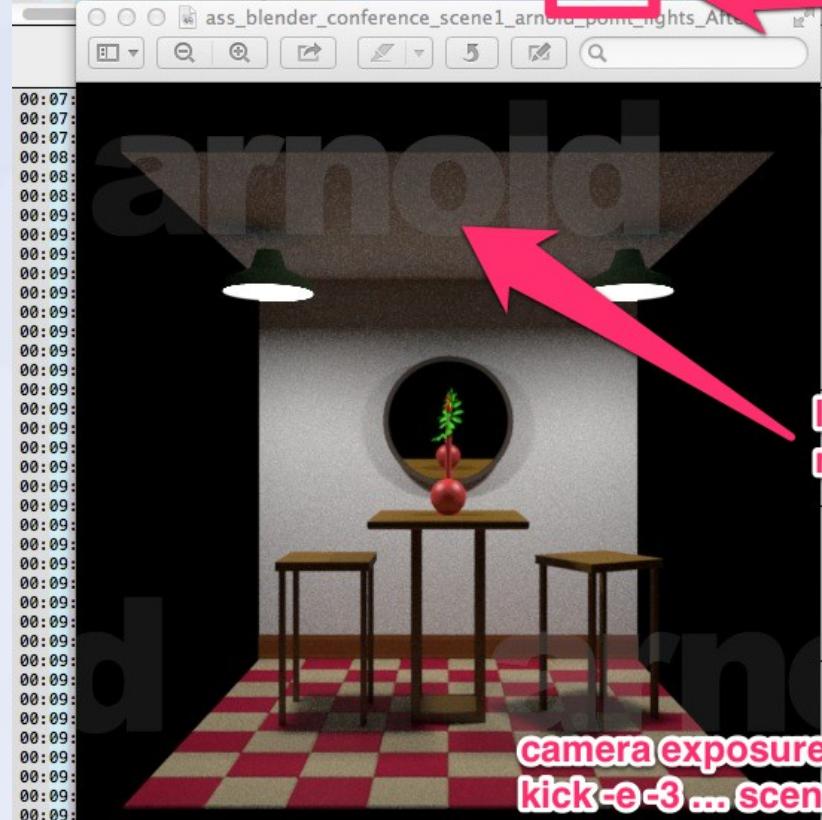
- **Naming convention to export primitives (e.g. spheres, disks, cones, ...)**
- **Custom properties to change export behavior**

scene1\_arnold\_point\_lights.log - /Users/wahn/git/radiance\_vs\_younameit/ass/blender\_conf

```
00:19:42 22MB | 100% done - 4423 rays  
00:19:42 22MB | bucket workers done in 19:42.51  
00:19:42 22MB | render done  
00:19:42 22MB | [driver_png] writing file 'scene1_arnold_point_lights.png'  
00:19:42 22MB |  
00:19:42 22MB | scene creation time:  
00:19:42 22MB | plugin loading 0:00.00  
00:19:42 22MB | .ass parsing 0:00.00  
00:19:42 22MB | system/unaccounted 0:00.00  
00:19:42 22MB | total 0:00.00  
00:19:42 22MB |  
00:19:42 22MB | render time:  
00:19:42 22MB | node init 0:00.00  
00:19:42 22MB | bucket rendering 19:42.51  
00:19:42 22MB | accel. building 0:00.01  
00:19:42 22MB | pixel rendering 19:42.49 (multi-threaded)  
00:19:42 22MB | system/unaccounted 0:00.07  
00:19:42 22MB | total 19:42.69 (89%)
```

scene1\_arnold.log - /Users/wahn/git/radiance\_vs\_younameit/ass/blender\_conference

```
00:09:47 22MB | 100% done - 2558 rays/pixel  
00:09:47 22MB | 9:47.90  
00:09:47 22MB | render done  
00:09:47 22MB | [driver_png] writing file 'scene1_arnold.png'  
00:09:48 22MB |  
00:09:48 22MB | scene creation time:  
00:09:48 22MB | plugin loading 0:00.00  
00:09:48 22MB | .ass parsing 0:00.01  
00:09:48 22MB | system/unaccounted 0:00.01  
00:09:48 22MB | total 0:00.01 (17.19% machine)  
00:09:48 22MB |  
00:09:48 22MB | render time:  
00:09:48 22MB | node init 0:00.00  
00:09:48 22MB | bucket rendering 9:47.90  
00:09:48 22MB | accel. building 0:00.01  
00:09:48 22MB | pixel rendering 9:47.89 (multi-threaded)  
00:09:48 22MB | system/unaccounted 0:48.89  
00:09:48 22MB | total 9:48.02 (91.69% machine)
```



camera exposure had to be adjusted:  
kick-e-3 ... scene1\_arnold\_point\_lights.ass

BUT

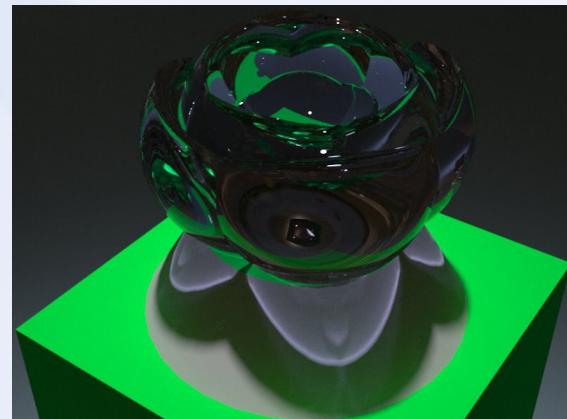
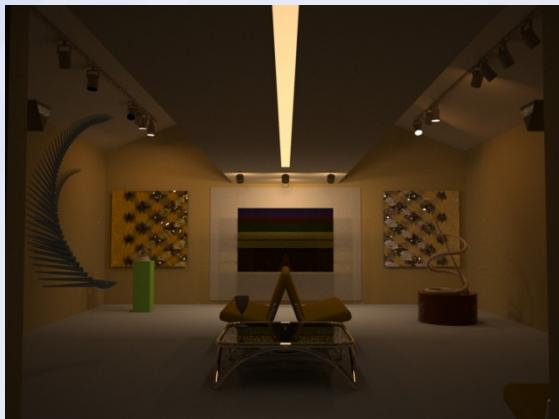
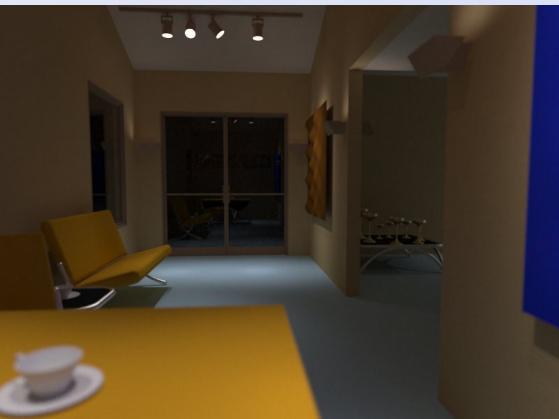
less  
noise

# Cycles Render Engine

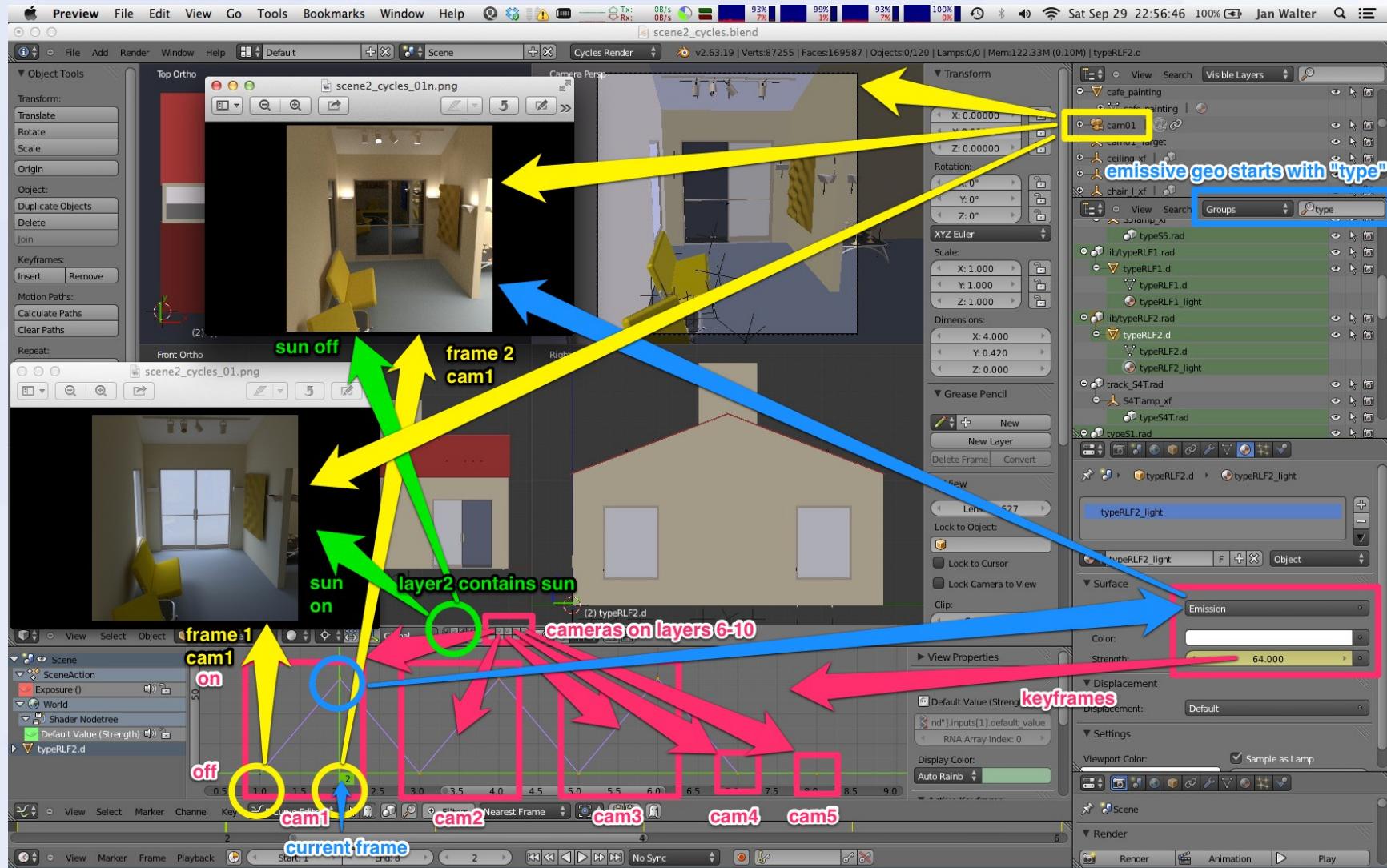


Bedroom by Rui Teixeira on Blend Swap

# Gallery Scene



# Gallery Scene (Cycles)



# Future Plans - Ideas

- **Unified exporter** (for several renderers)
- **Forum** to discuss different GI renderers
- More (public) test scenes
- Radiance exporter (not just an importer)?
- Arnold importer? E.g. Blender → Maya
- Shading languages? OSL?
- **Cooperation** with you guys ...

# Links

- The Mill
  - <http://themill.com>
  - <http://www.facebook.com/MillChannel>
- Jan Walter
  - [http://www.janwalter.com ...](http://www.janwalter.com)
  - [.../RadianceVsYouNameIt/radiance\\_vs\\_younameit.html](#)
  - [.../Download/PDF/blender\\_conf\\_2012\\_slides.pdf](#)
  - <http://janwalter.blogspot.co.uk>
  - <https://bitbucket.org/wahn/blender-add-ons/wiki/Home>

