

# Colour Grading

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# Colour Grading?

POST

ORIGINAL



<https://vimeo.com/49487885>

# Colour Grading?



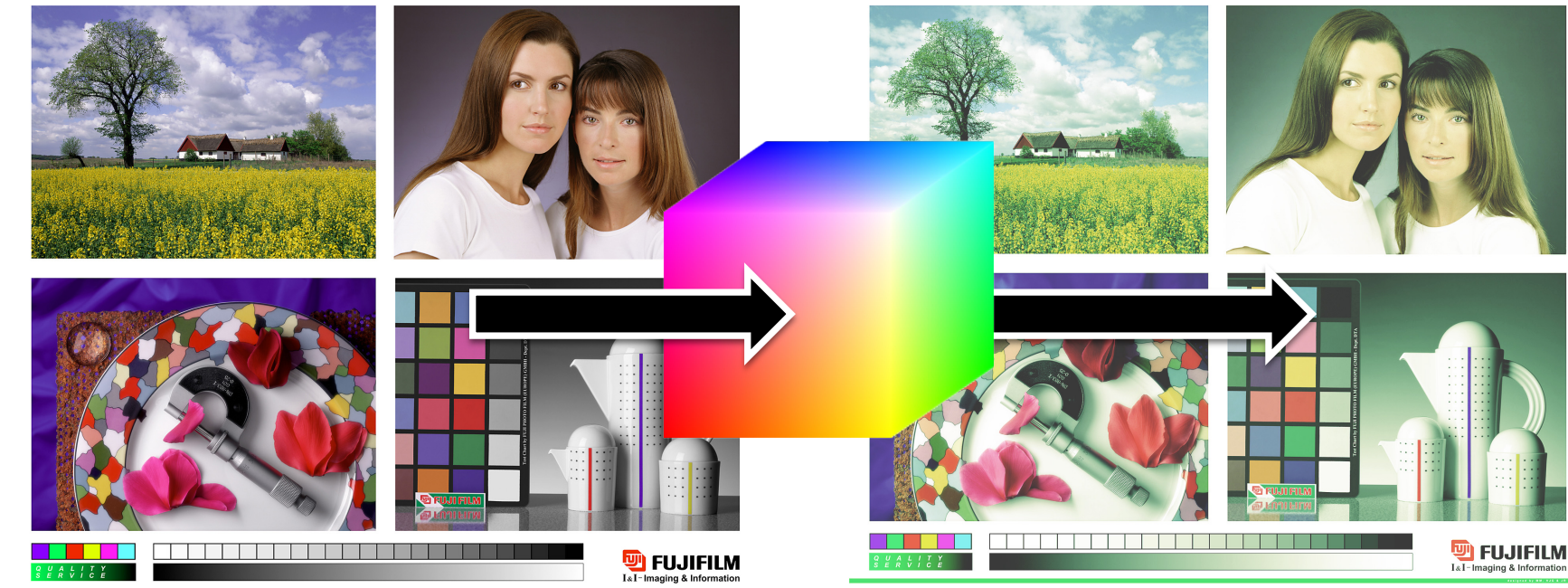
<http://udn.epicgames.com/Three/ColorGrading.html>



- Technique coming from film post production
- Change colours to give film/game a distinctive look
- Everybody (over)does it, even in games
  
- Primary Colour Correction
  - Global operation over the whole frame
- Secondary Colour Correction
  - Mask parts of the image, → chroma/luma key, etc...

- Apply *arbitrary* primary colour corrections
  - no predefined mathematical model
- Relatively low computational cost
  - GPU friendly!
- Easy to implement
  - Programmer friendly!
- Easy to tweak
  - Artist friendly!
- **Solution: 3D Lookup Table!**

# The Idea



input RGB → Lookup → output RGB

- Using a 3D LUT texture with tri-linear interpolation yields a piecewise linear function
- $32^3$  is enough in most cases
- Resolution choice based on colour correction function
- Try out different sizes

```
in vec2 uv;

uniform sampler2D framebuffer;
uniform sampler3D LUT;

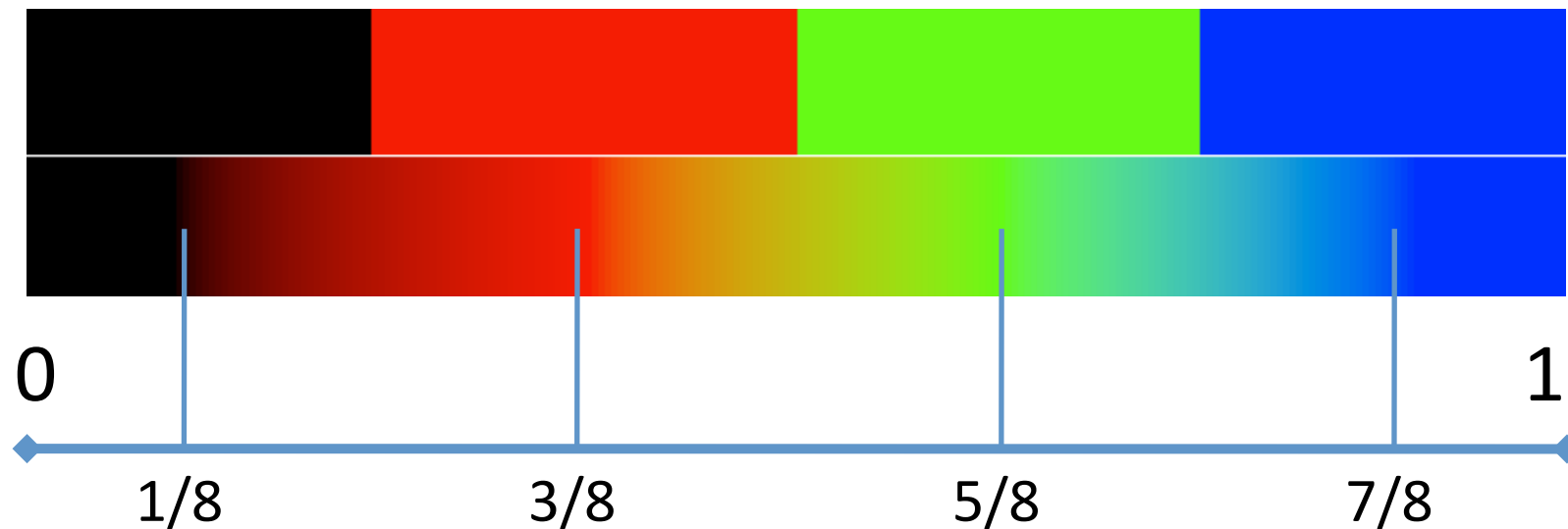
out vec4 colorOut;

vec3 color = texture(framebuffer, uv);
// tonemapping, vignetting, etc...

colorOut = texture(LUT, color.rgb);
```



- How to correctly sample the 3D LUT?



- Map input values to new interval:  $[0, 1] \rightarrow [1/8, 7/8]$

$$[0, 1] \rightarrow [1 / (2 * \text{size}), 2 * \text{size} - 1 / (2 * \text{size})]$$

# Generating a LUT

- Small python script

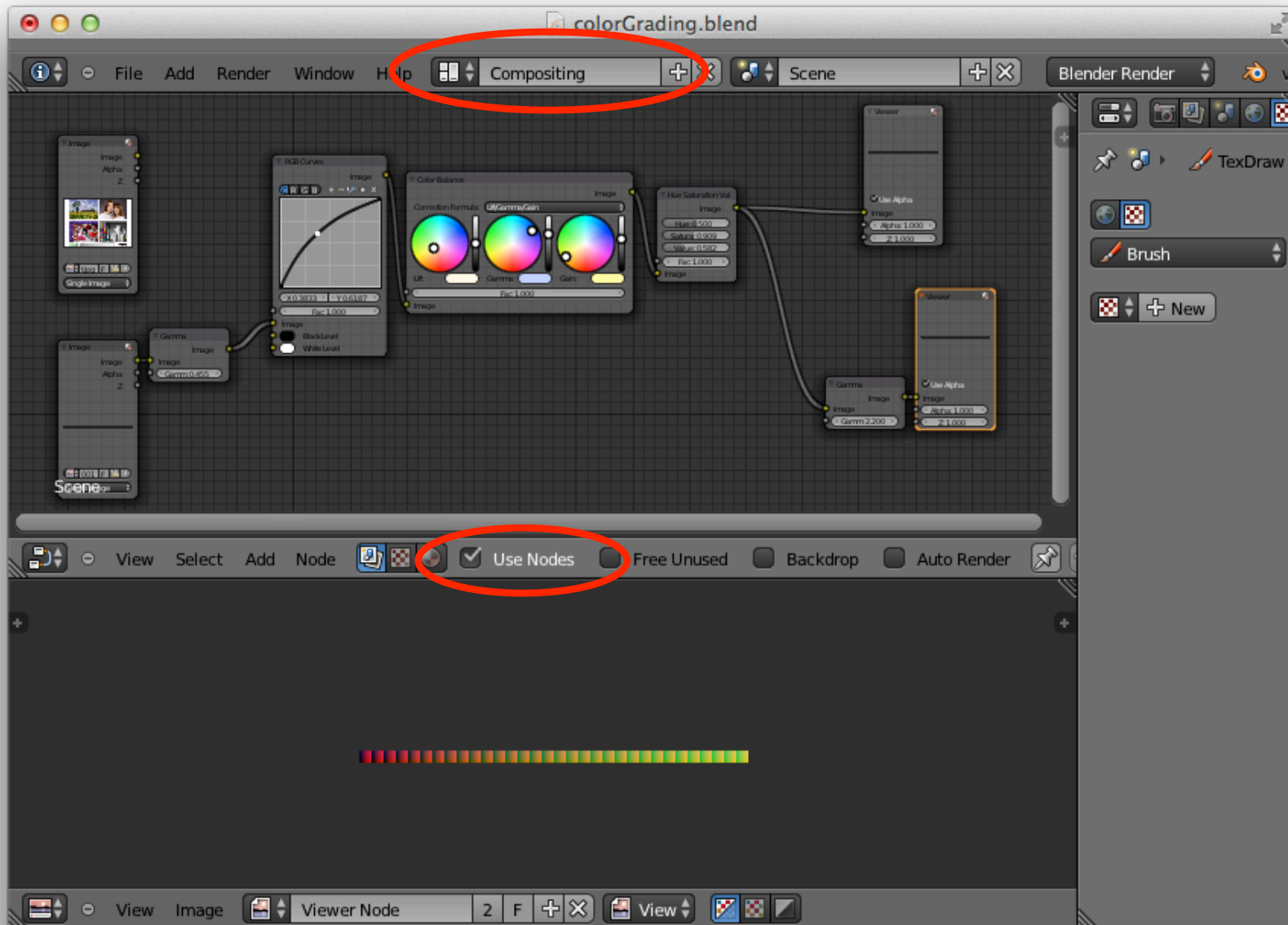
```
>> python create-lu.py <name> <size> <gamma>
```

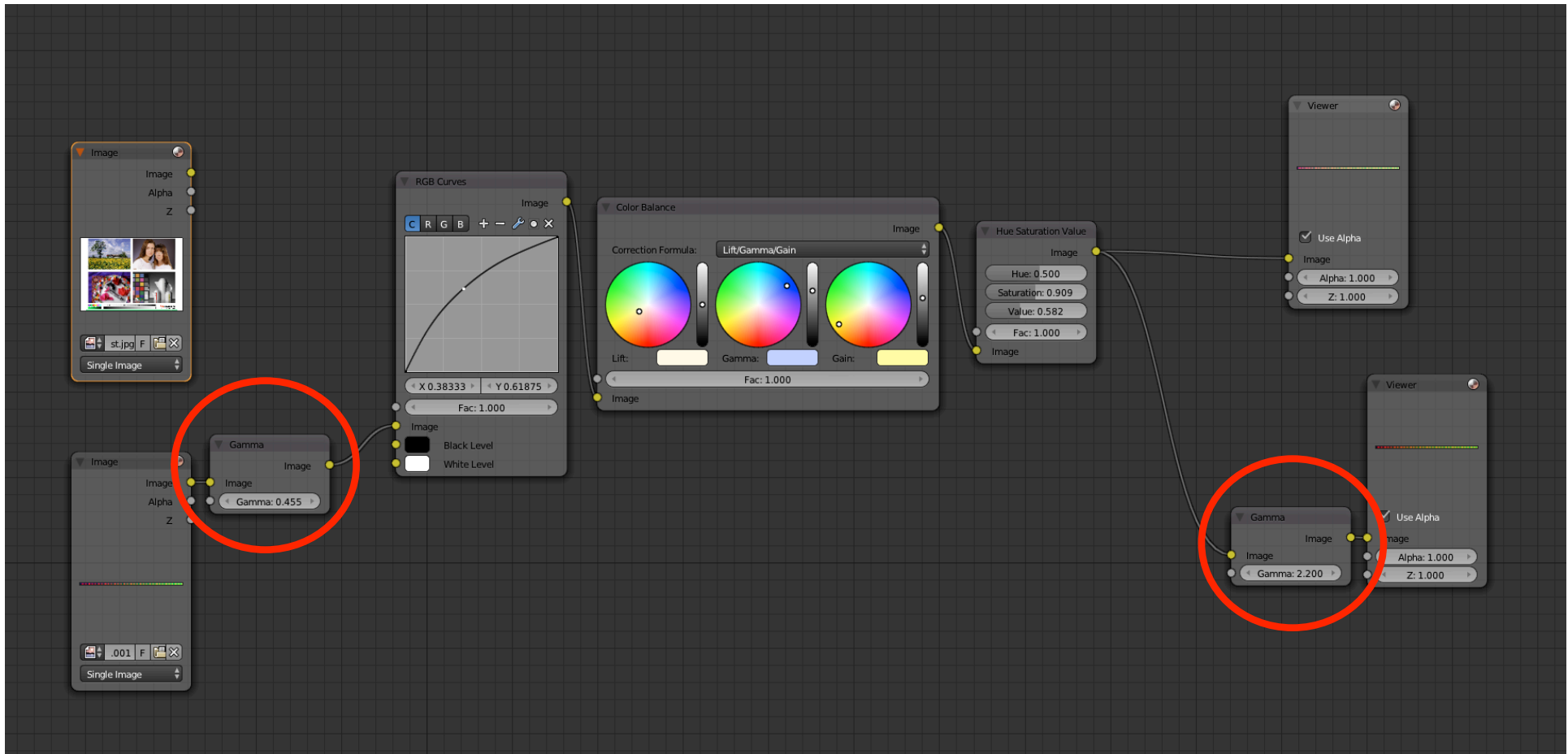
- Creates 3D texture image

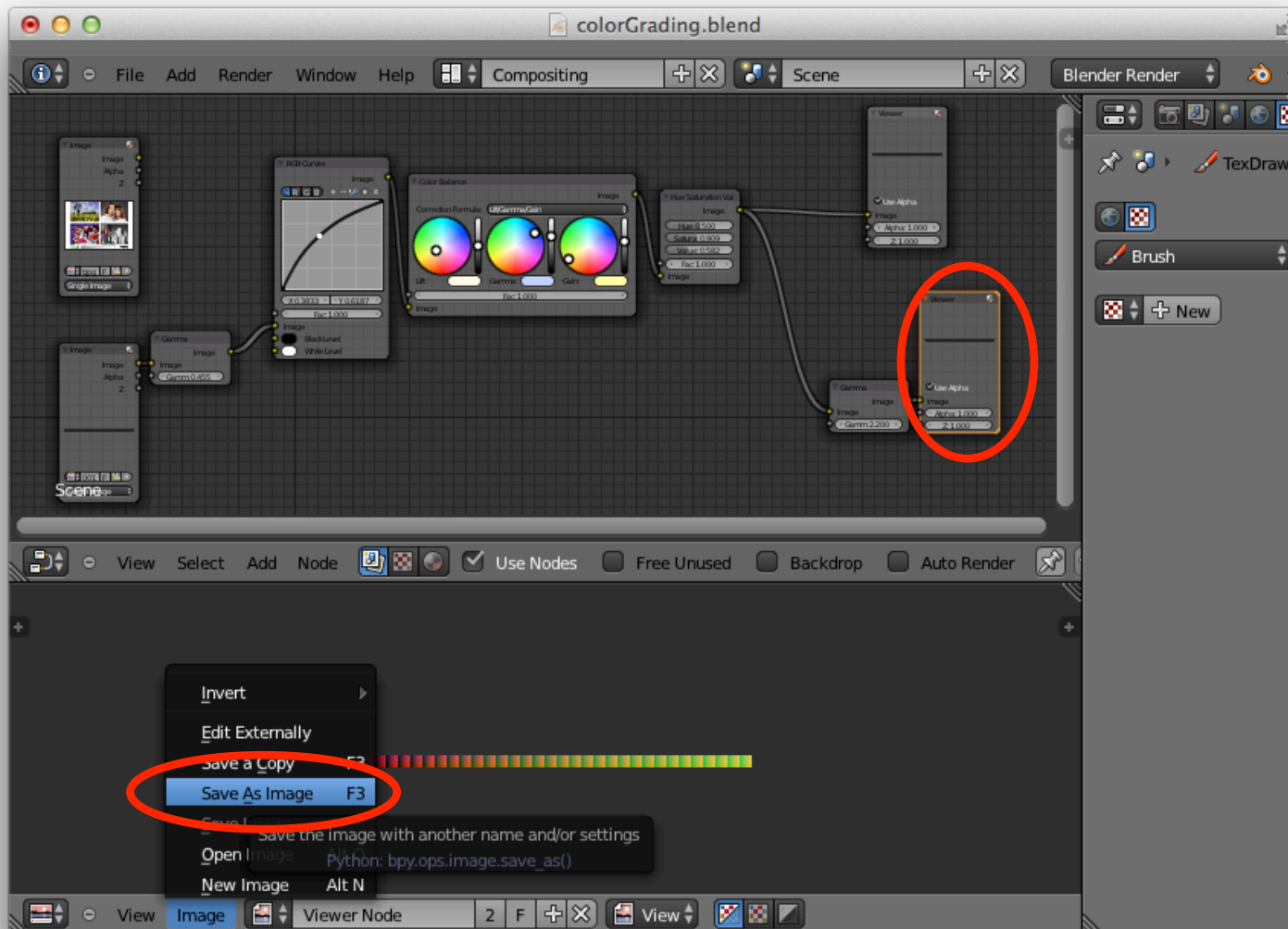


- Gamma most likely to be 1 or 2.2 depending on the workflow

- Linear or Gamma corrected workflows
  - More or less equivalent
  - Lookup always in linear space!
  - Read texture as sRGB or RGB
- Examples:
  - Blender (linear)
  - Photoshop (gamma corrected)







# Photoshop



- Easy to implement, easy to tweak
- You can use pretty much any tool you want
  - Professional colour grading software
  - Your favourite Photoshop filters
  - Whatever kind of Hipstagram filters you fancy
- Blend between multiple LUTs
- Add vignetting, film grain, chromatic aberration, barrel distortion, etc... for a *cinematic look*