What does Stereoscopic film making mean for VFX?

And how does that affect your production?

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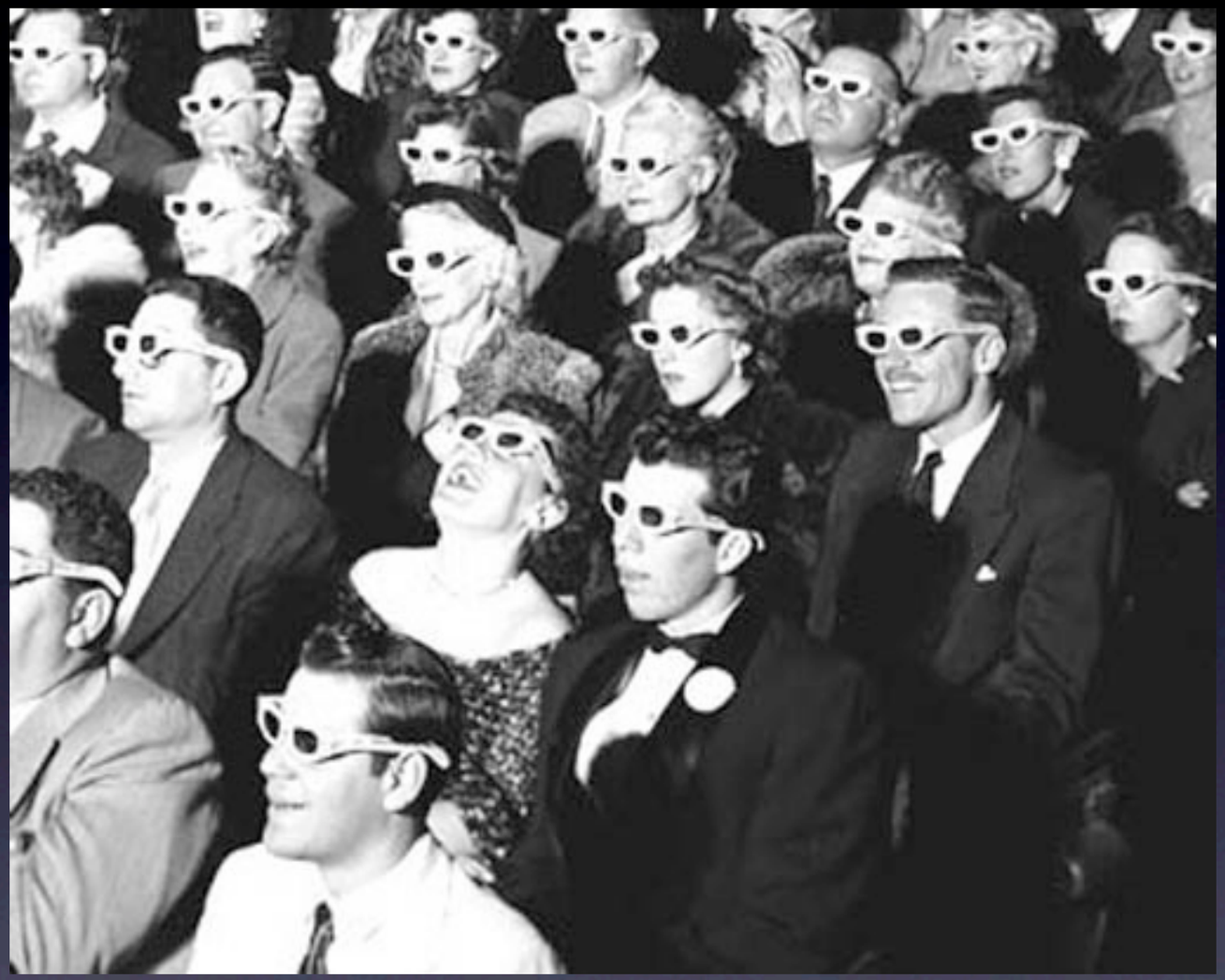
Don your 1D glasses...



What's all the buzz about?

- digital visual effects (the abyss, terminator 2 and jurassic park)
- CG feature animation (toy story)
- stereoscopic films... (avatar, alice in wonderland, aliens that ate my meatballs...)

Lump them all into one category...

Digital Visual Effects +
Computer Animated Feature Films =
VFX (for simplicity)

How is VFX and stereoscopy related?

- VFX technology has been advancing quickly
- stereoscopic technology is utilizing VFX research
- the groundwork laid by VFX technology has eased adoption of a stereo workflow

Understanding VFX...

- doing bad VFX is easy, doing good VFX is hard (and takes time, planning, money and all those things you don't have)
- less is more (and more is even more!)
- it's about moving forward and making decisions (good or bad)
- it can't save a bad movie

What is a shot made of? (simplified)

- plates
- elements
- CG assets (creatures, fire, environment, etc.)
- compositing
- grading

What adds complexity to a shot?

- badly lit green screen, backlit blonds, wobbly cameras
- creatures - especially when they need to be “the blue ones in that film I saw”
- fire, smoke, water
- many, many, things (crowds, jungle, etc.)

Why is this complex?

- it's all about the details
- a creature is made up of muscle, bone, skin, clothing, pores, fur, follicles, tear ducts, cornea...
- then they need to move
- and we need to be able to iterate quickly on changes

Then you add a lot of them...

- crowds and environments increase this complexity
- every tree, plant, rock, blade of grass etc. has to be considered
- crowds mean multiple characters, more hair styles, uniqueness, and realism
- and it all has to be ***rendered***!

Rendering?

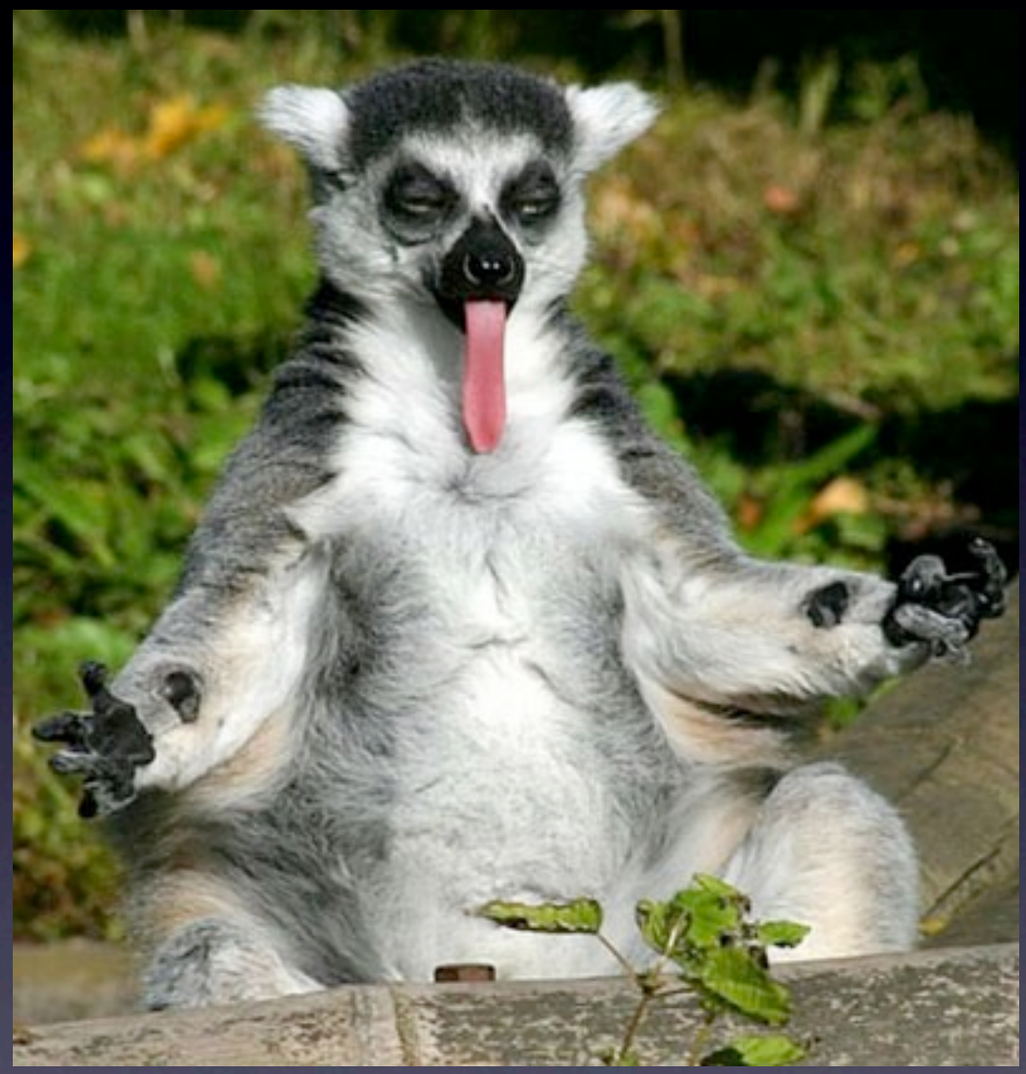
- you hear the word bandied about, but what does it mean?
- simplest description is “to take a picture of what your digital cameras sees of your digital world”
- a more complex description...

Complex.....

- scene is converted into a scene description
- the camera projection is derived from camera settings
- iterates through every object in the scene
    - that object is broken into it's most simple form (a grid of micropolygons)
    - is that actually visible?
    - if so it's projected onto the frame
- each of these grids is visited, and for each point on the grid it determines how it's going to be shaded
    - contribution from each light in the scene is computed
    - textures and details are referenced from paintings
    - subsurface, occlusion and other computationally intensive lighting performed
- all this shading information is then gathered and combined into a pixel
- do it all over again.....

(and that's still an extremely simple description)

Breathe...



you don’t need to worry about that

But it takes time

- although we are generally smart people, the process takes time
- we're still learning how to work faster, and more importantly, efficiently
- we're still learning how to make things look real
- lets look at an example...

The complexity of Avatar as an example

- forget that it was a stereoscopic film (if you can...)
- full screen humanoid aliens that needed to look REAL
- lots of them
- on a planet covered by dense jungle
- not to mention flying mountains, clouds and many many other creatures
- acting

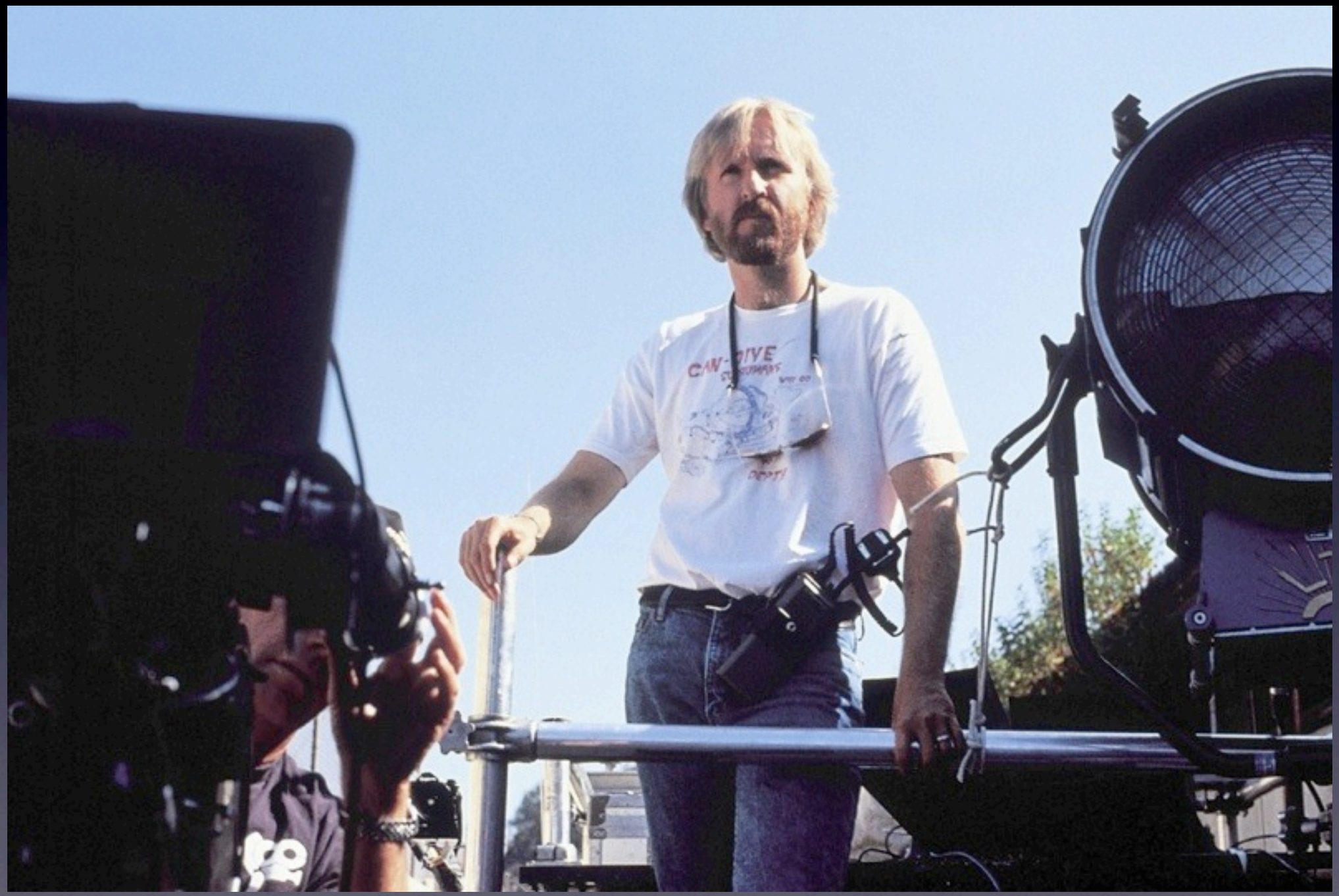
A few of the advances made on Avatar

- updated skin shading
- light computation using spherical harmonics
- motion capture and motion retargeting for creatures and lead characters, including faces and underlying muscle systems
- deep image compositing, where one frame describes multiple depths
- ecosystems that live

An achievement...

- even as a mono (“old school”) film, Avatar was a massive achievement
- then someone decided it would be a good idea to make it stereo...

This guy...



Stereo adds even more complexity...

- two eyes need to be rendered for every frame
- lighting differs between each eye (highlights and reflections), so shading needs to be calculated differently
- matte paintings = ***fail***, everything needed to be built
- spacial composition needs to be considered
  - a jungle that looks extremely dense in 2D will seem empty in 3D
  - can't break the stereo window
  - how is DOF going to affect the stereo effect
- what else needs to be considered? post stereo adjustments? cut cushioning?
- and that's just on the VFX side of things...

But what does this all mean?

- we don’t know
- what we do know is that there’s no concrete formula to determine how much more it’s going to cost
- it needs to be organized!

How can the pain (and cost) be minimized?

- norway isn't any different than the rest of the world, get over it!
- adoption and agreement on standards and "language" (file formats, meta data, target colour space, projection, etc.)
- do all films need to be stereo?
- don't forget that you're telling a story, and not just a stereo film (it has to work on all levels)
- engage us sooner, work closely with us and...
- heed our warnings (aka. don't be stupid)

Most importantly!

Lead, don't follow!