

Computer Graphics

Lecture 3: Modelling

Kartic Subr

What is a model?

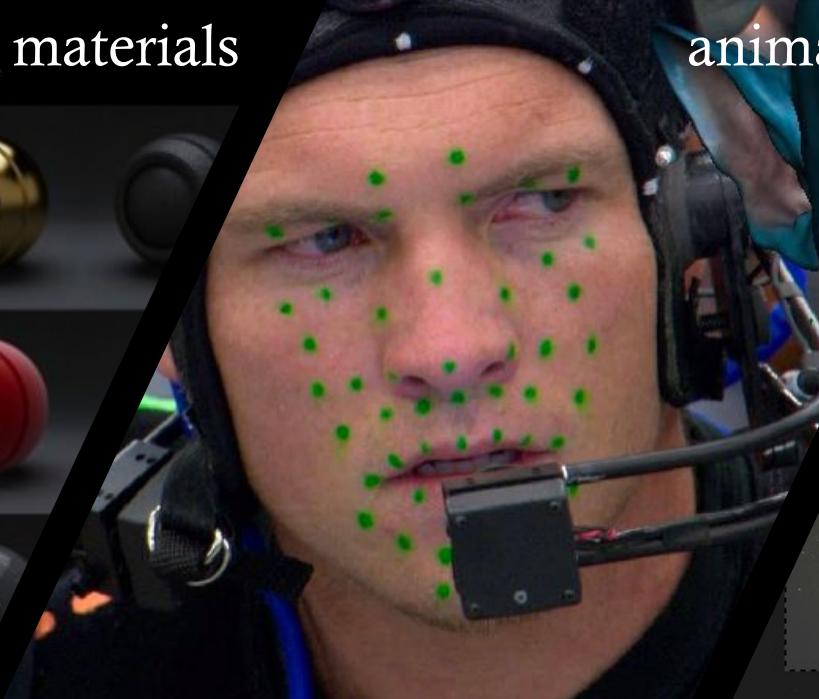
What is a model?

use (a system, procedure, etc.) as an example to follow or imitate.

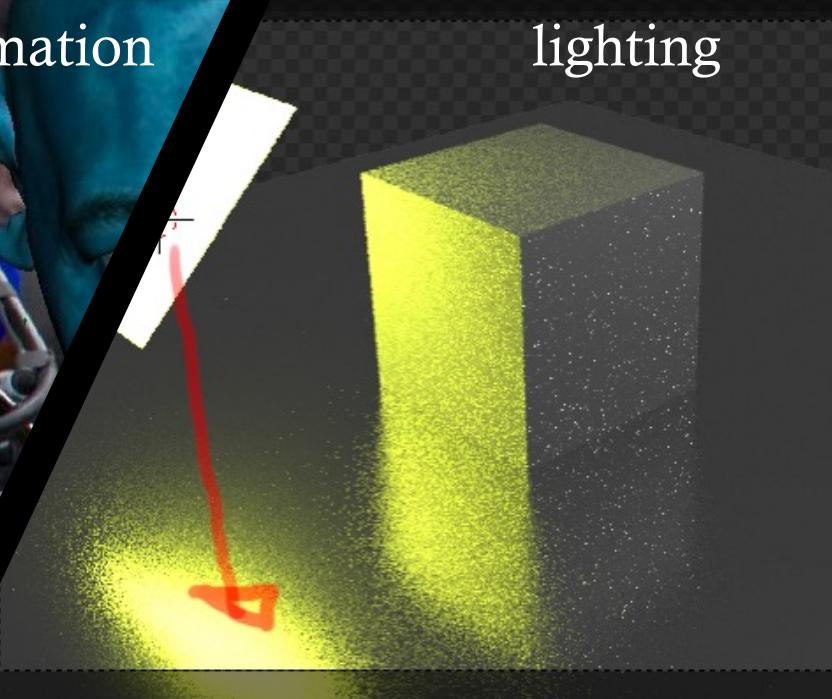
Autodesk
3ds Max

v-ray

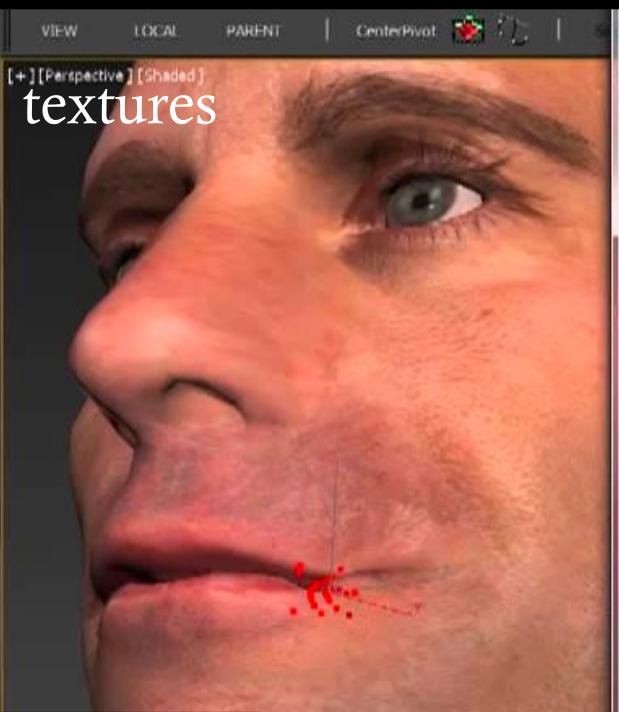
Shader Collection Vol.1
Metal Plastic Ceramic Velvet Rubber Glass Water Beverage



animation

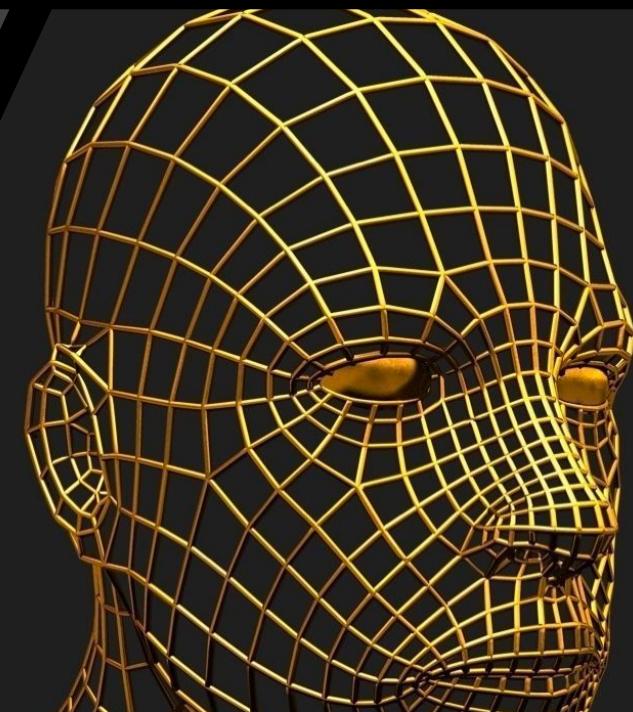
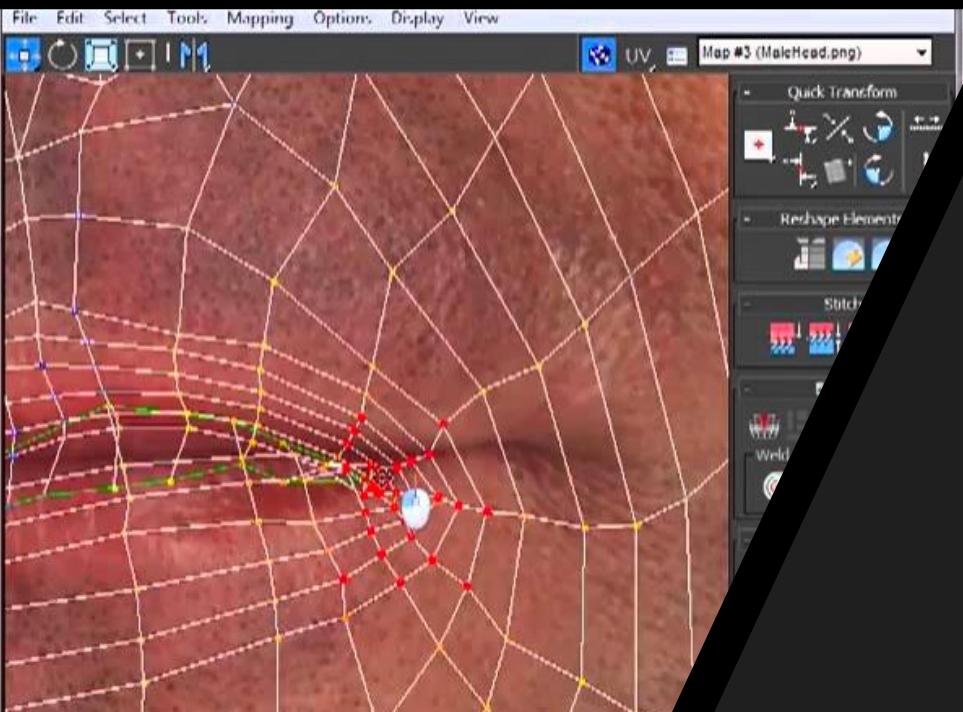


lighting



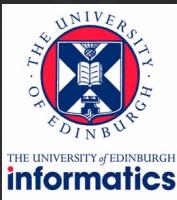
VIEW LOCAL PARENT | CenterPivot

[+] [Perspective] [Shaded]
textures



geometry

Search videos showing ‘effects breakdown’



<https://www.youtube.com/watch?v=DVlroZ3Lbg0>

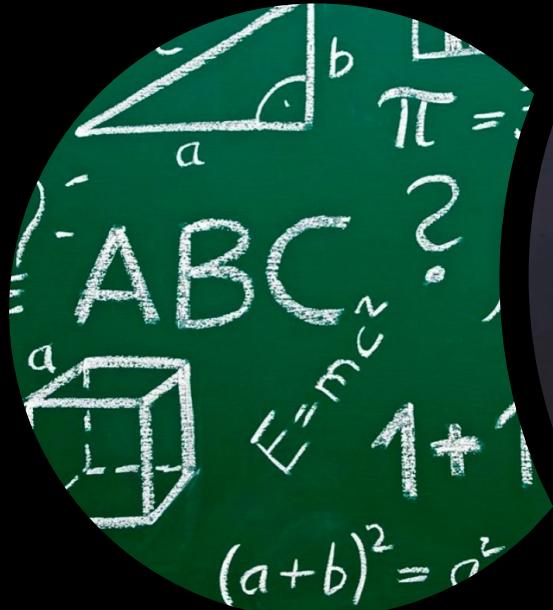
https://www.youtube.com/watch?v=CRl3Rn_ud9g

<https://www.youtube.com/watch?v=pTffQIFFYR8>

Approaches to modelling

Artistic creation

maths



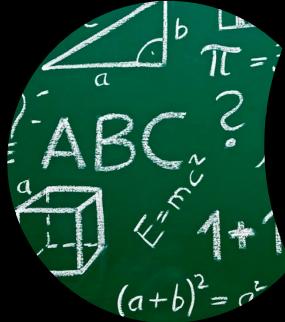
measurement



Approaches to modelling

maths

- Use physics
- Repeated procedure
- Analytical shapes (sphere)



Artistic creation



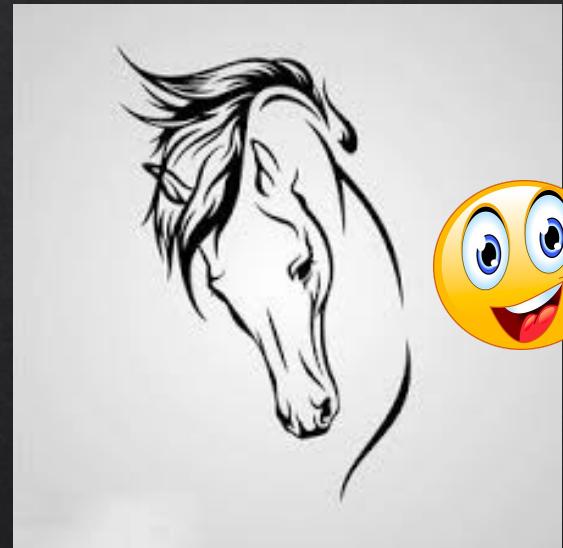
measurement

- 3D scan
- Photograph
- Motion capture



manually created models

FAKE

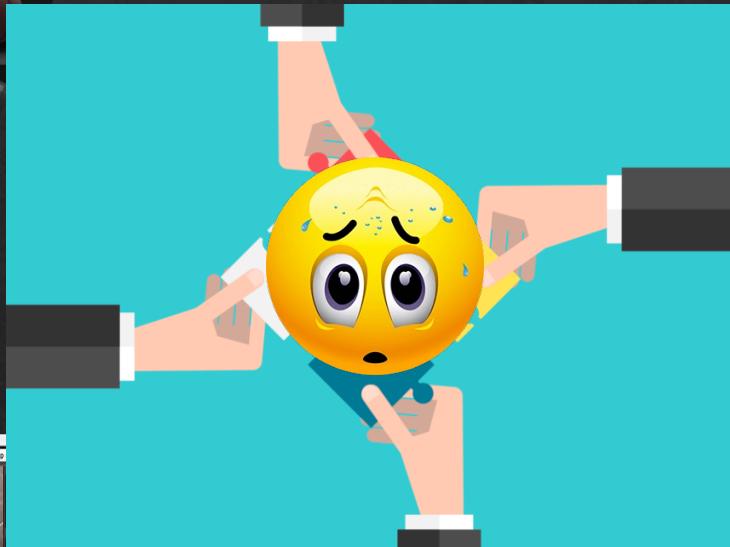


artistic expression



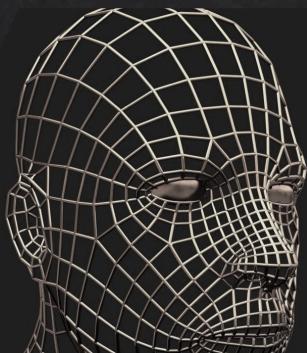
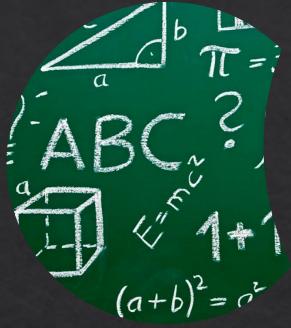


measurement





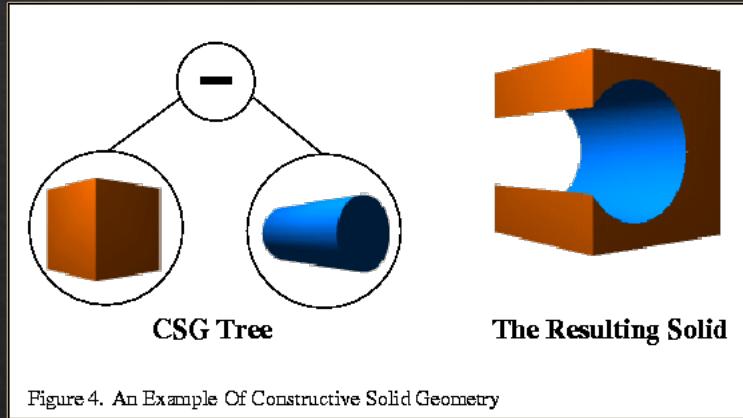
mathematical models



3D shape representations

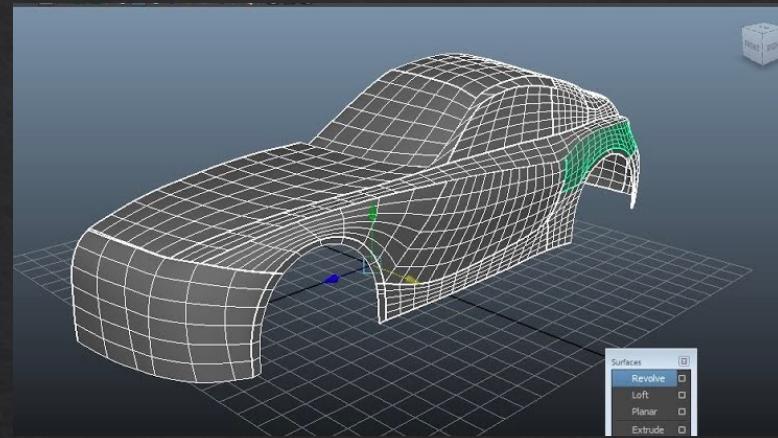
- Implicit representation
- Explicit representations
 - primitives
 - parametric

3D modelling – common approaches



constructive solid geometry

https://www.cs.cmu.edu/~scoros/cs15869-s15/lectures/05-CSG_Procedural.pdf



parametric surfaces

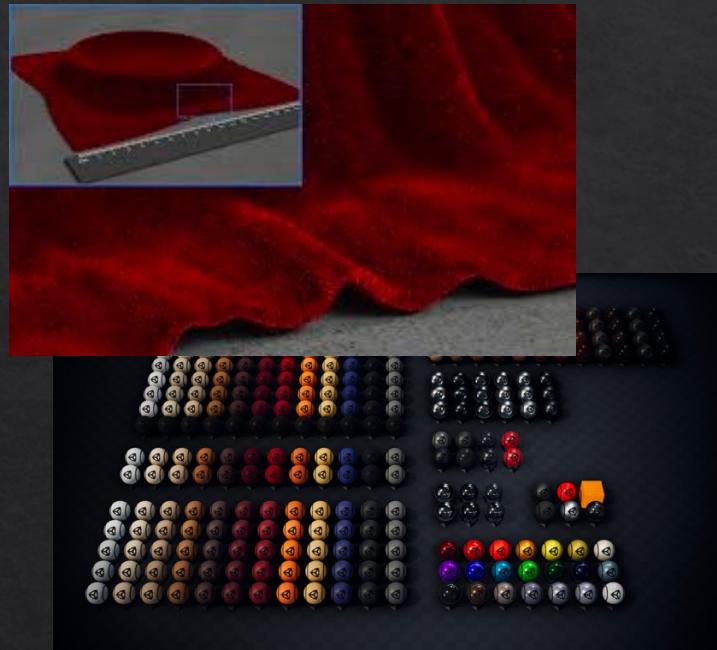
<http://www.inf.ed.ac.uk/teaching/courses/cg/lectures/slides16.pdf>



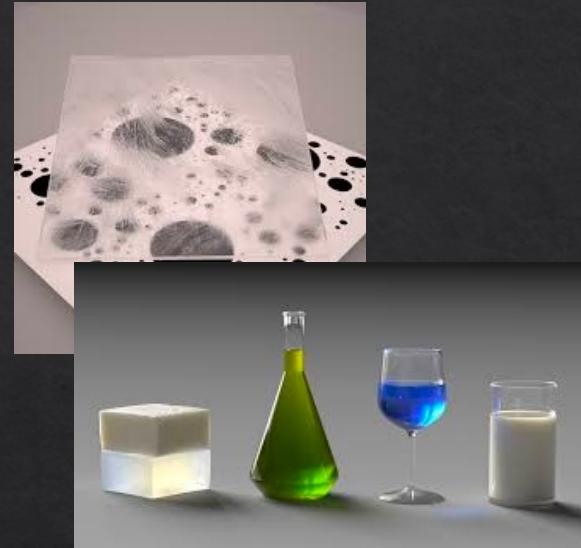
procedural modelling

<https://www.cs.princeton.edu/courses/archive/spring03/cs426/lectures/16-procedural.pdf>

Materials – common approaches



measured



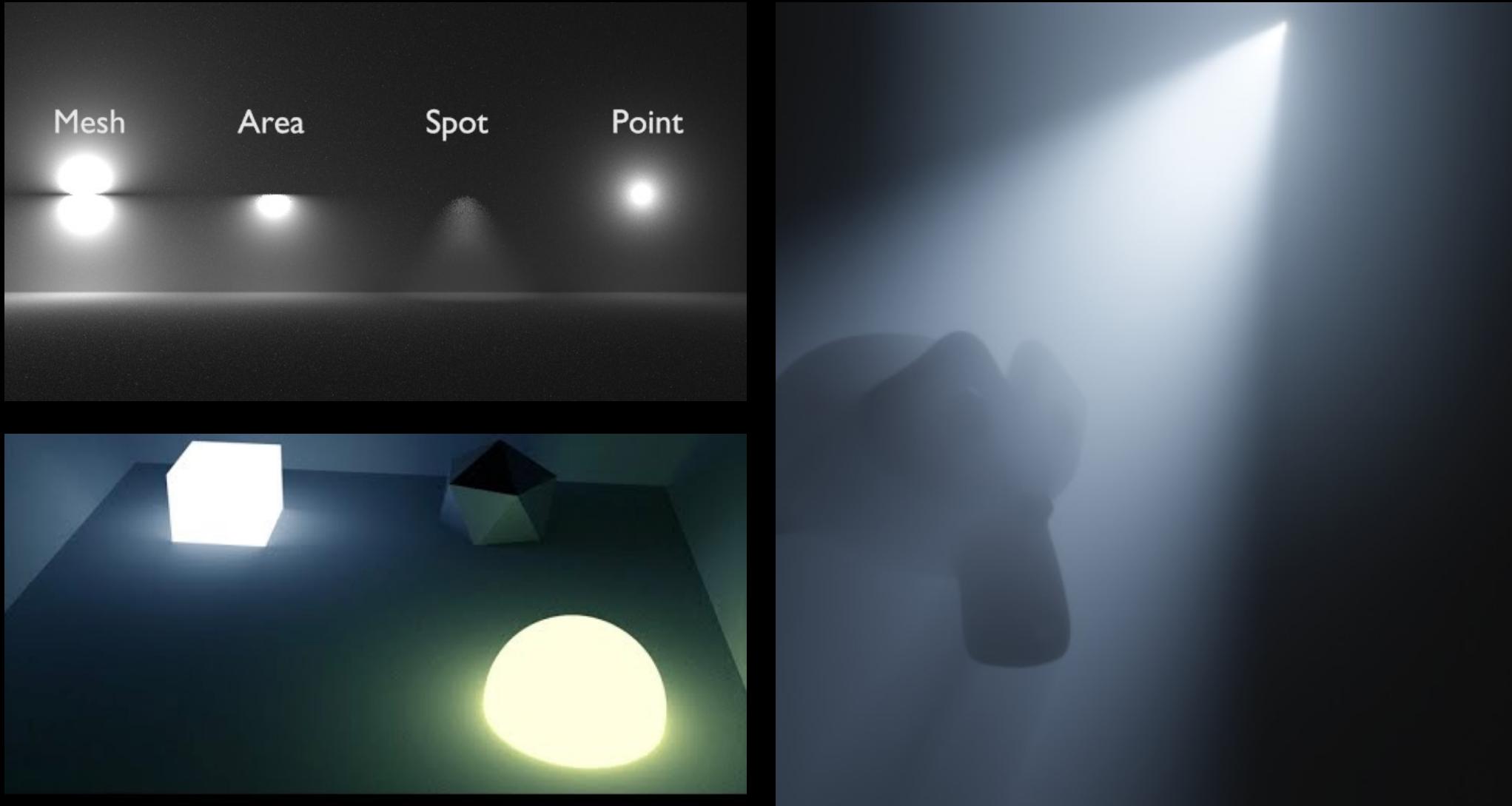
parametric e.g. ggx, bssrdf



procedural modelling

more about this, later in the course ...

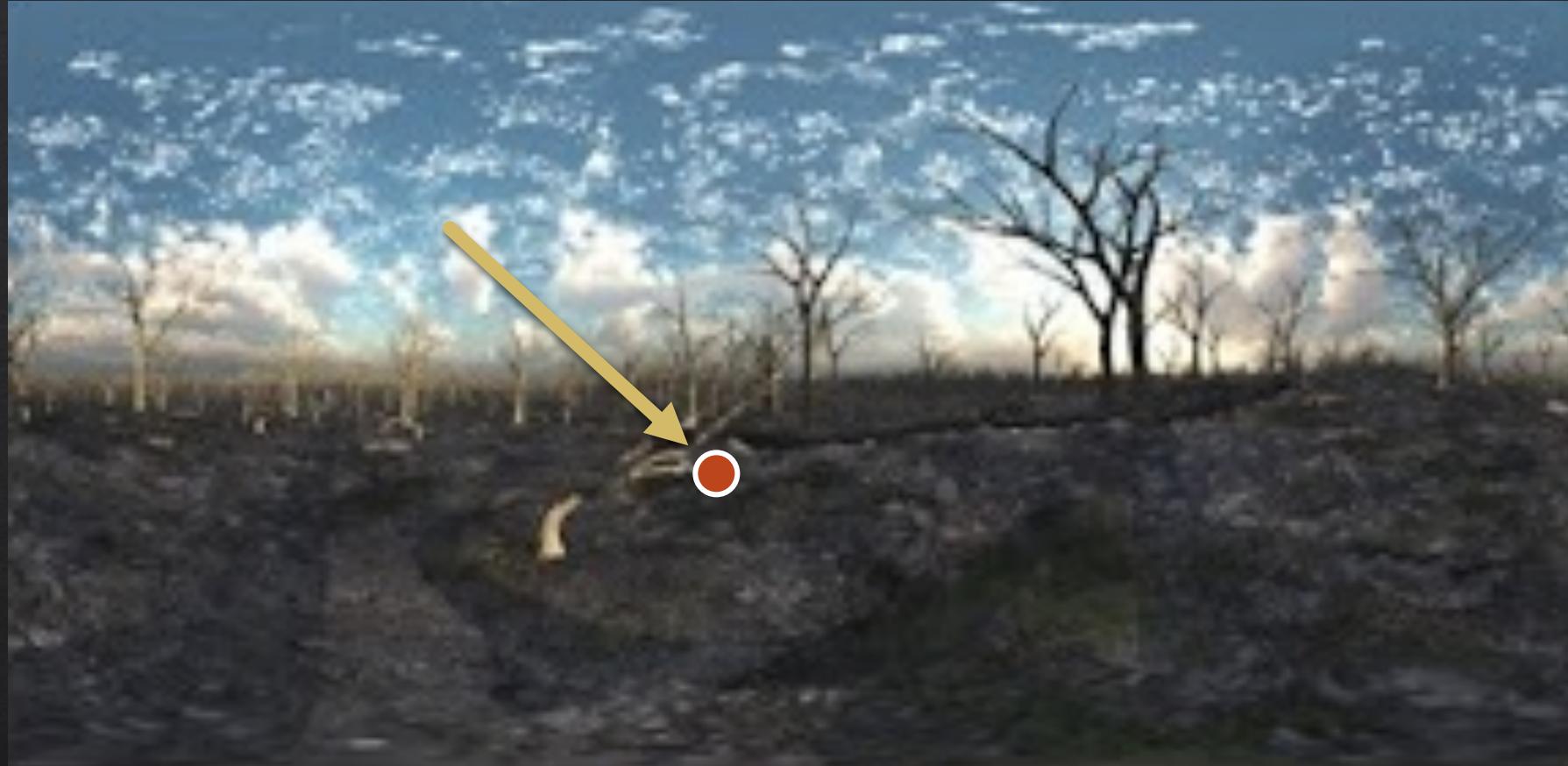
Lighting



Environment Maps



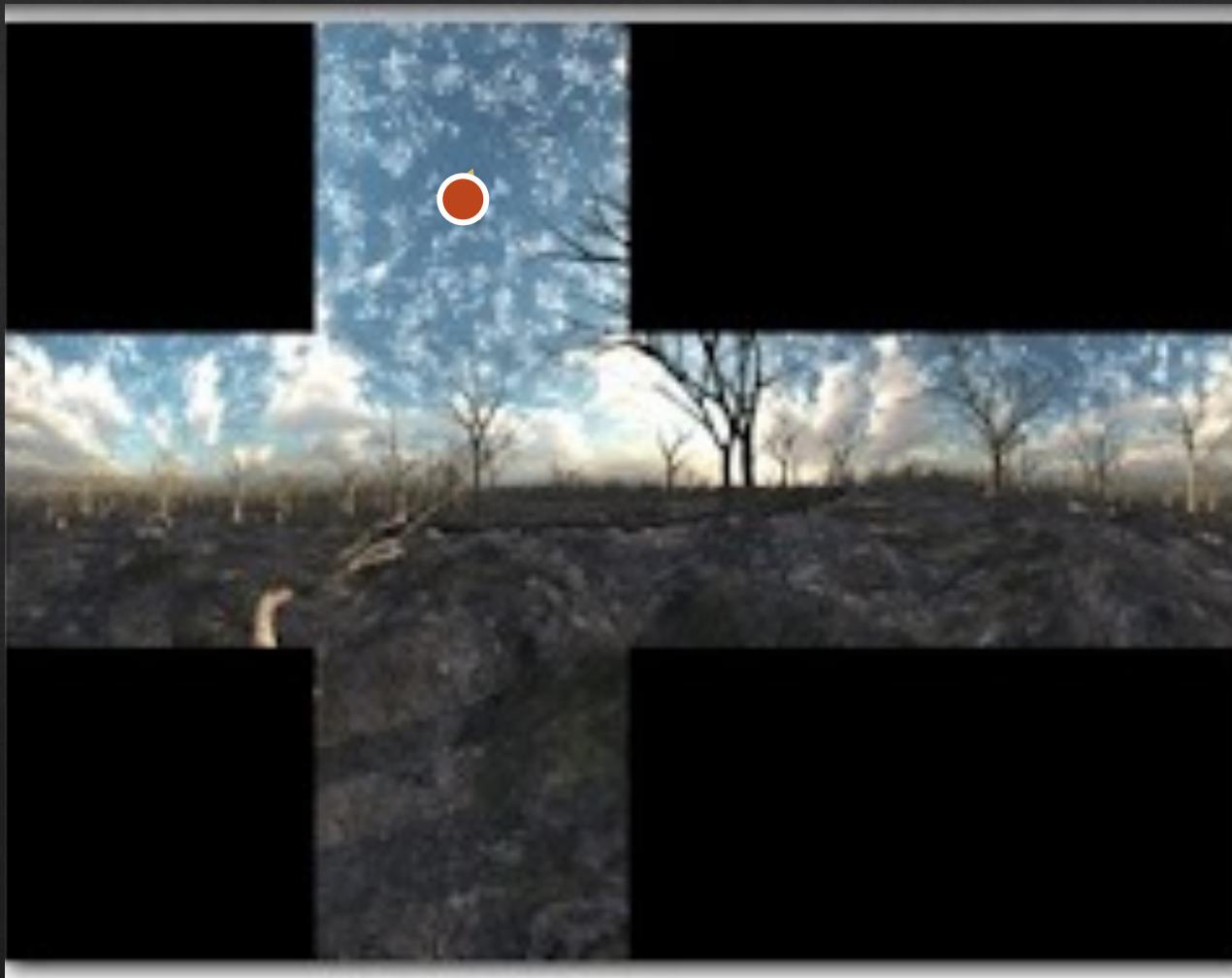
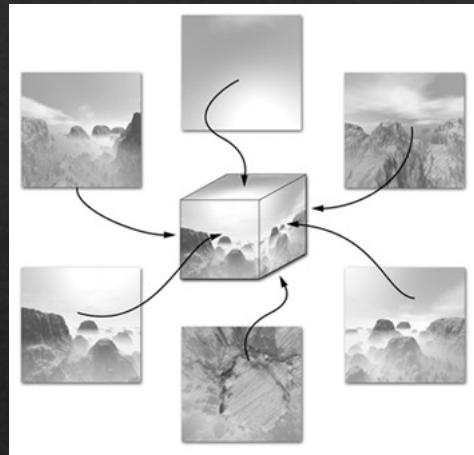
Environment Maps



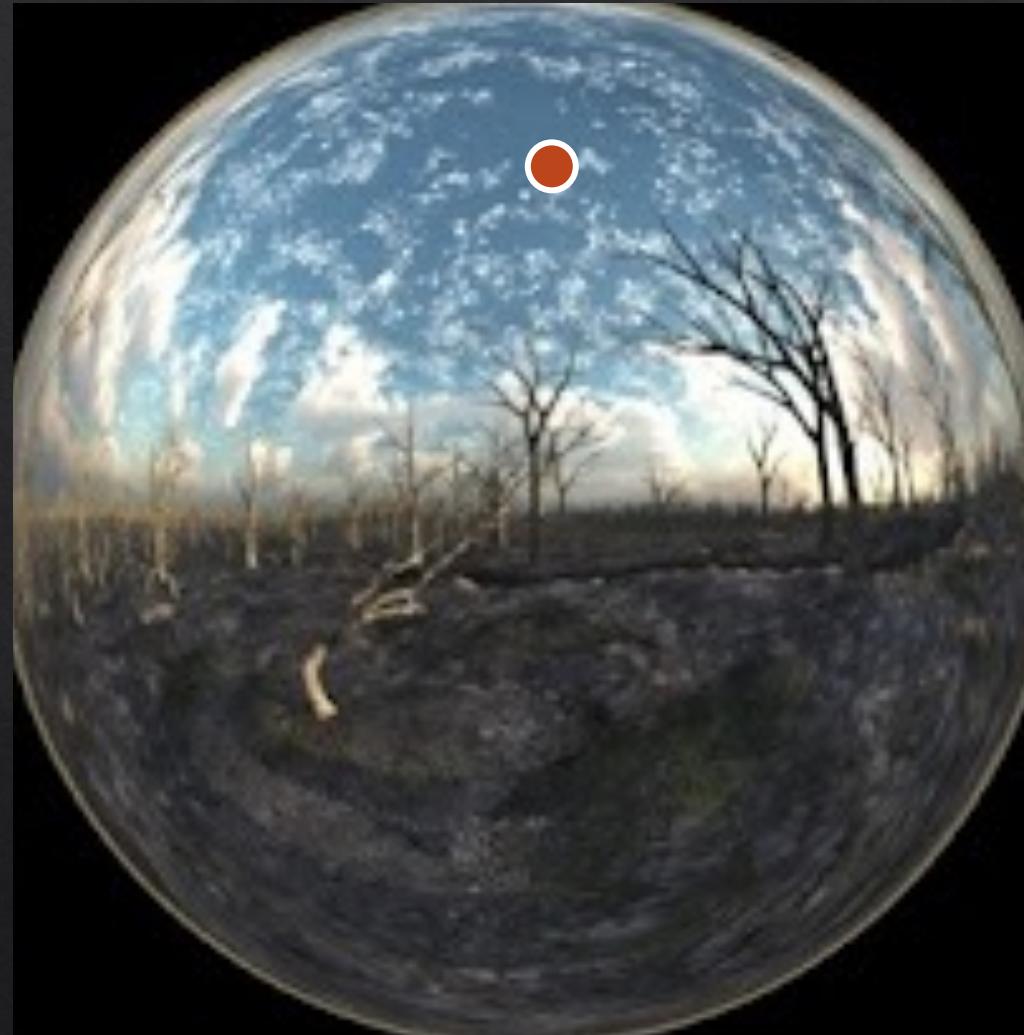
Environment Maps



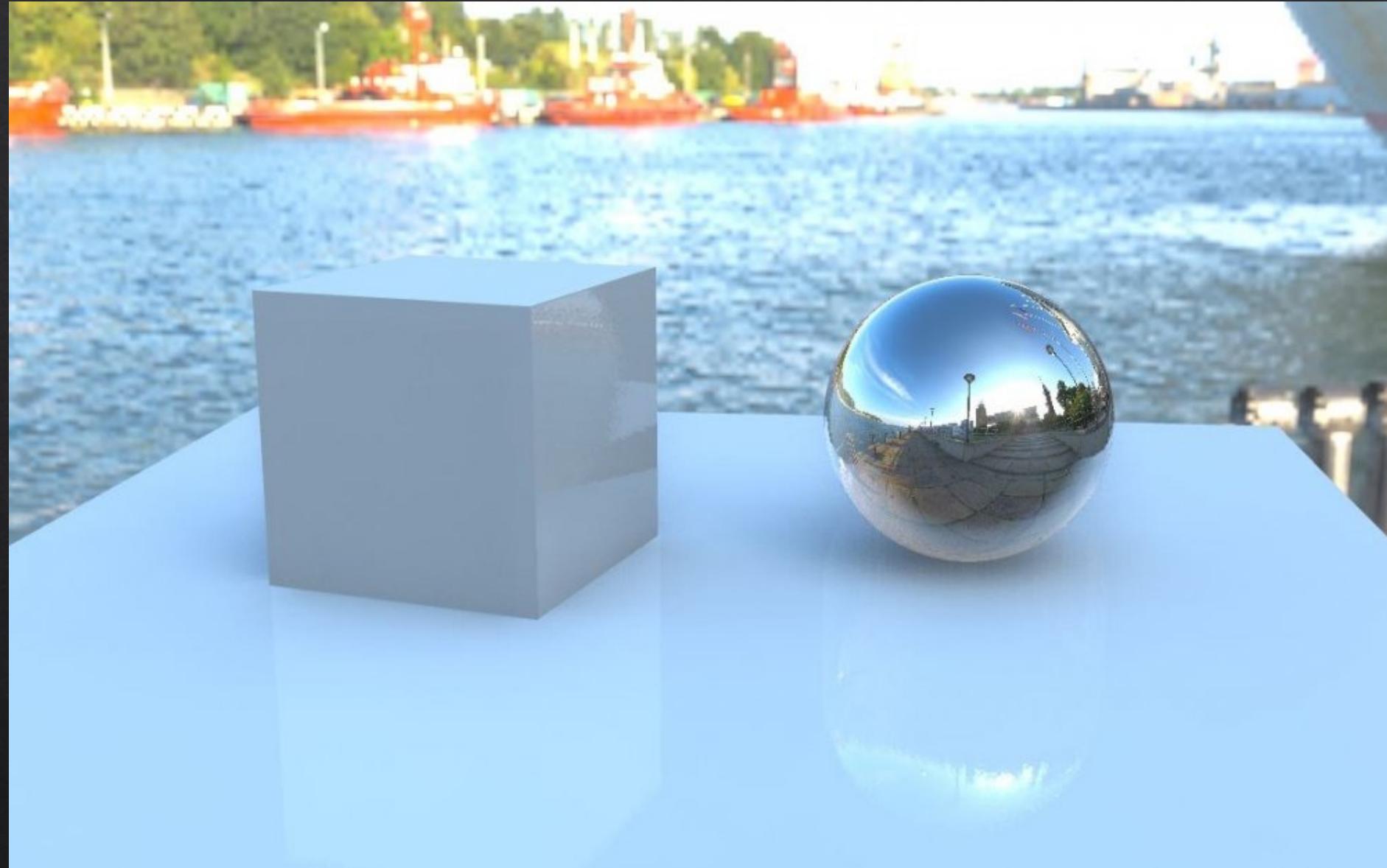
Environment Maps – cube map



Environment Maps – other parameterisations



Environment Maps – directional lighting





Deep Learning for Content Creation





Taming the Beast, Courtney Chaney

Sanja Fidler

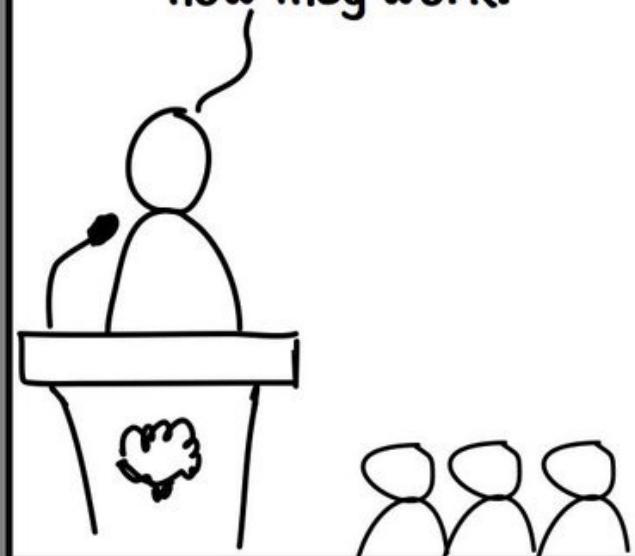


<https://www.cs.utoronto.ca/~fidler/>

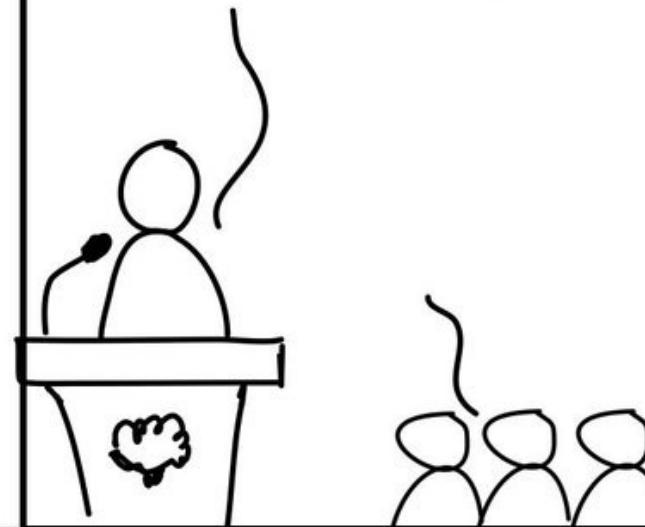
<https://www.youtube.com/watch?v=1kkFcg9k9ho>

Artificial General Equivalence

Our brains are complex
and we don't understand
how they work.



Deep learning networks
are complex and we don't
understand how they work.



Therefore deep learning
works like the brain.

