MODELING AND MATERIALS

RECOLLECTION

OBJECT REPRESENTATION

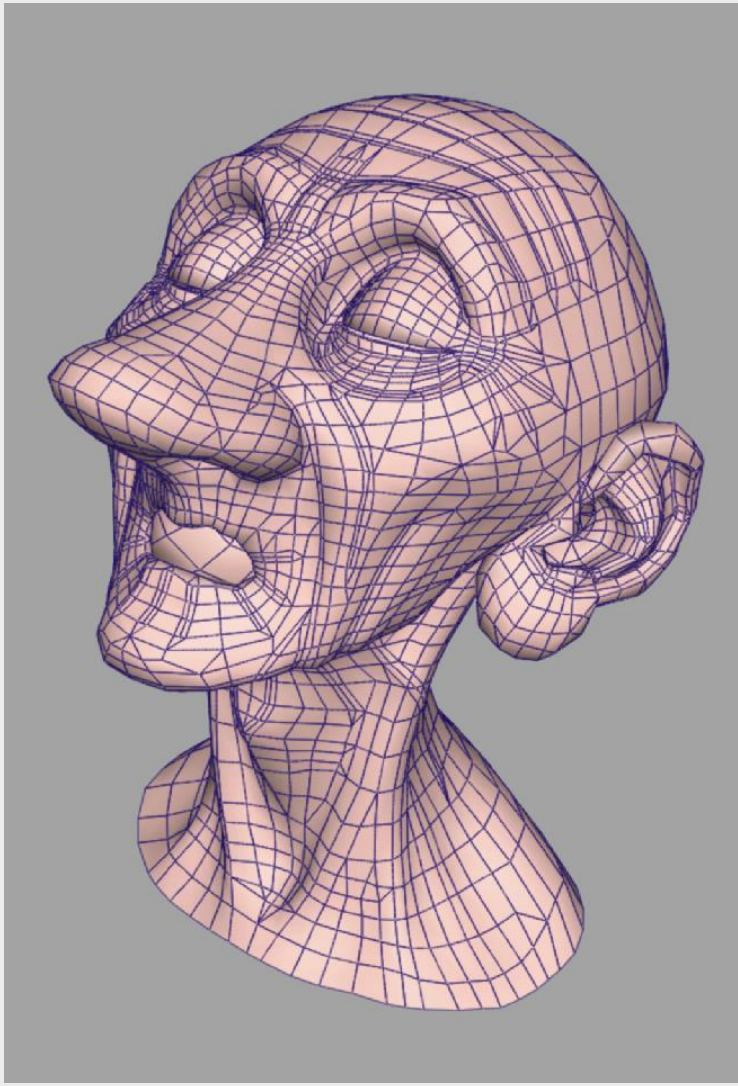
BOUNDARY (SHELL)

REPRESENTATION

VOLUME REPRESENTATION

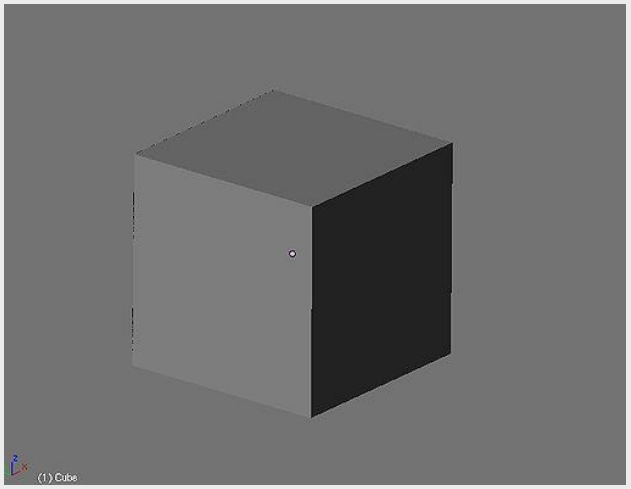
PARAMETRIC & POLYGONAL

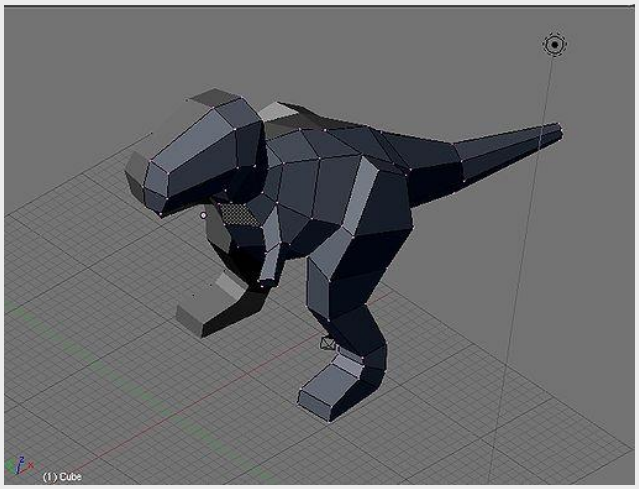
Conversion to polygonal

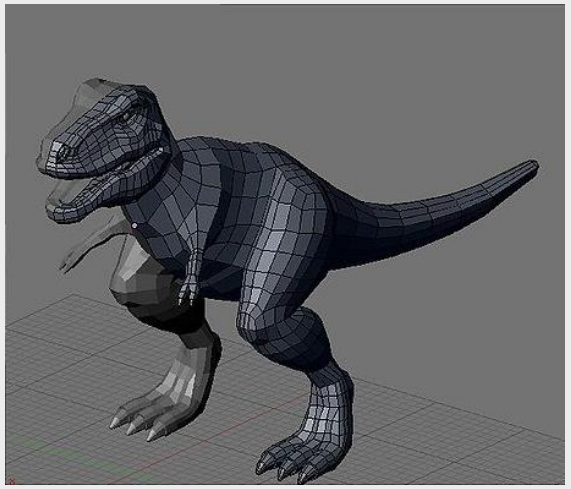


MODELING

FILLING THE PARTICULAR REPRESENTATION WITH DATA







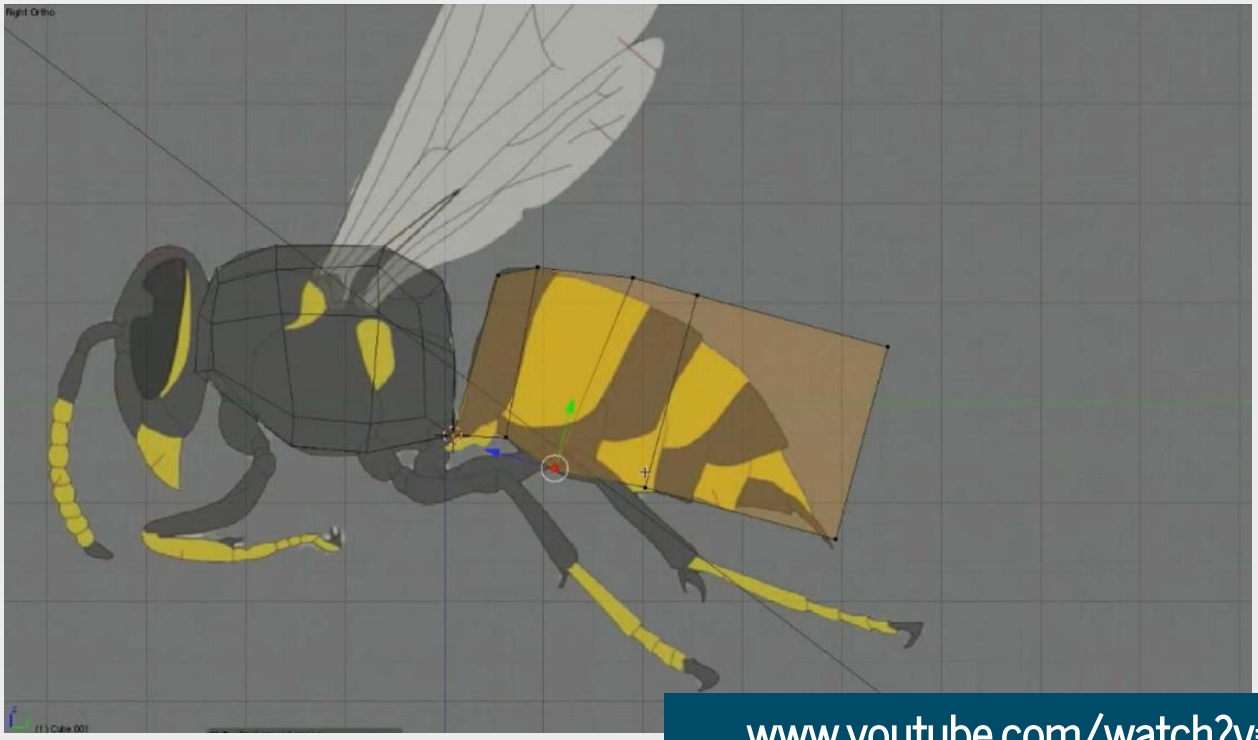
MANUAL
PROCEDURAL
ACQUISITION

BOX MODELING

ADD NEW VERTICES, MOVE VERTICES, REPEAT

...

POLYGONAL



www.youtube.com/watch?v=iBgtB-yQtsY

SCULPTING

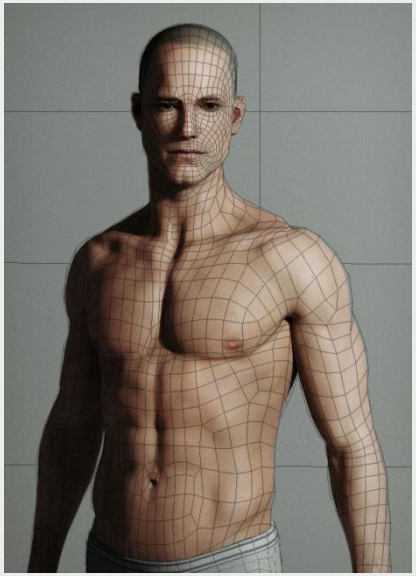
PUSH/PULL/PINCH SURFACE AREAS AS CLAY

POLYGONAL

www.youtube.com/watch?v=8rznwQt_jcU

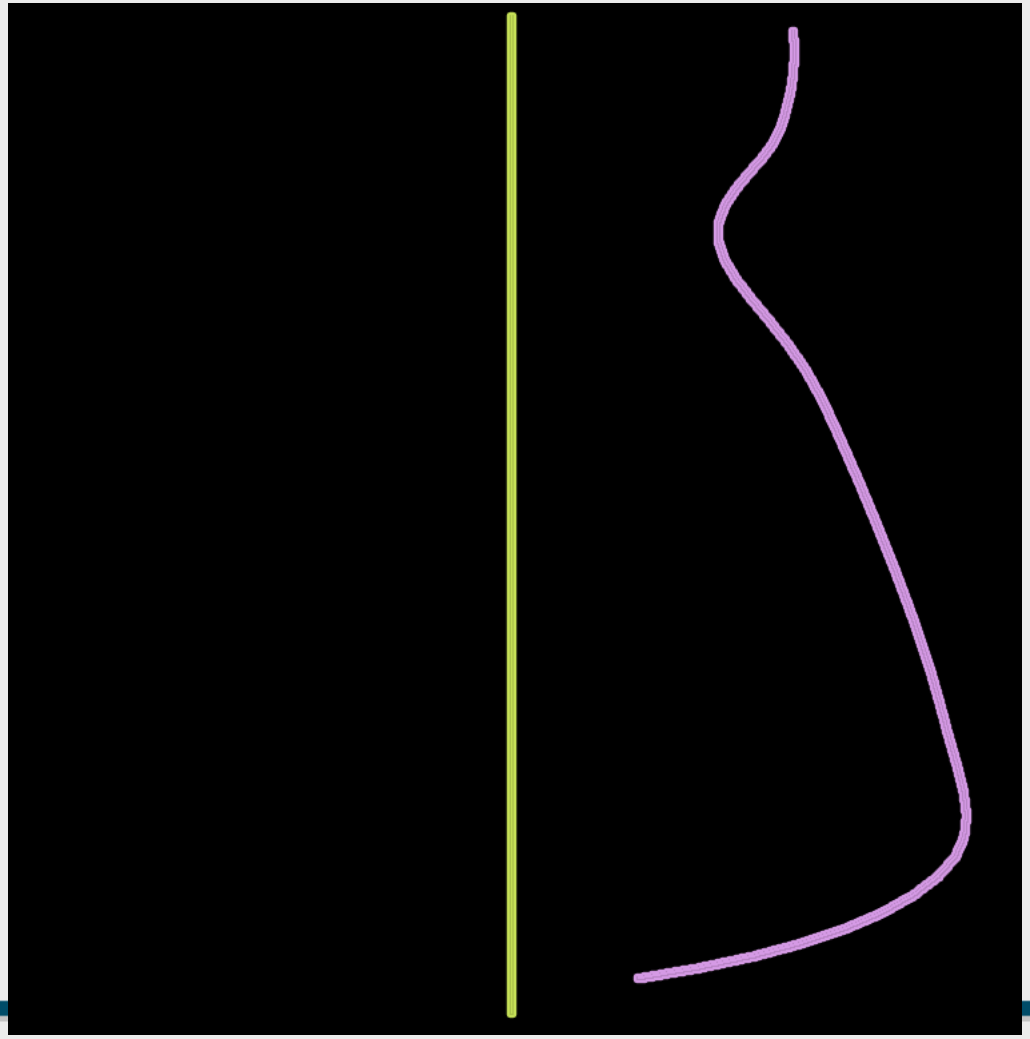
EXAMPLE

WWW.TEN24.INFO



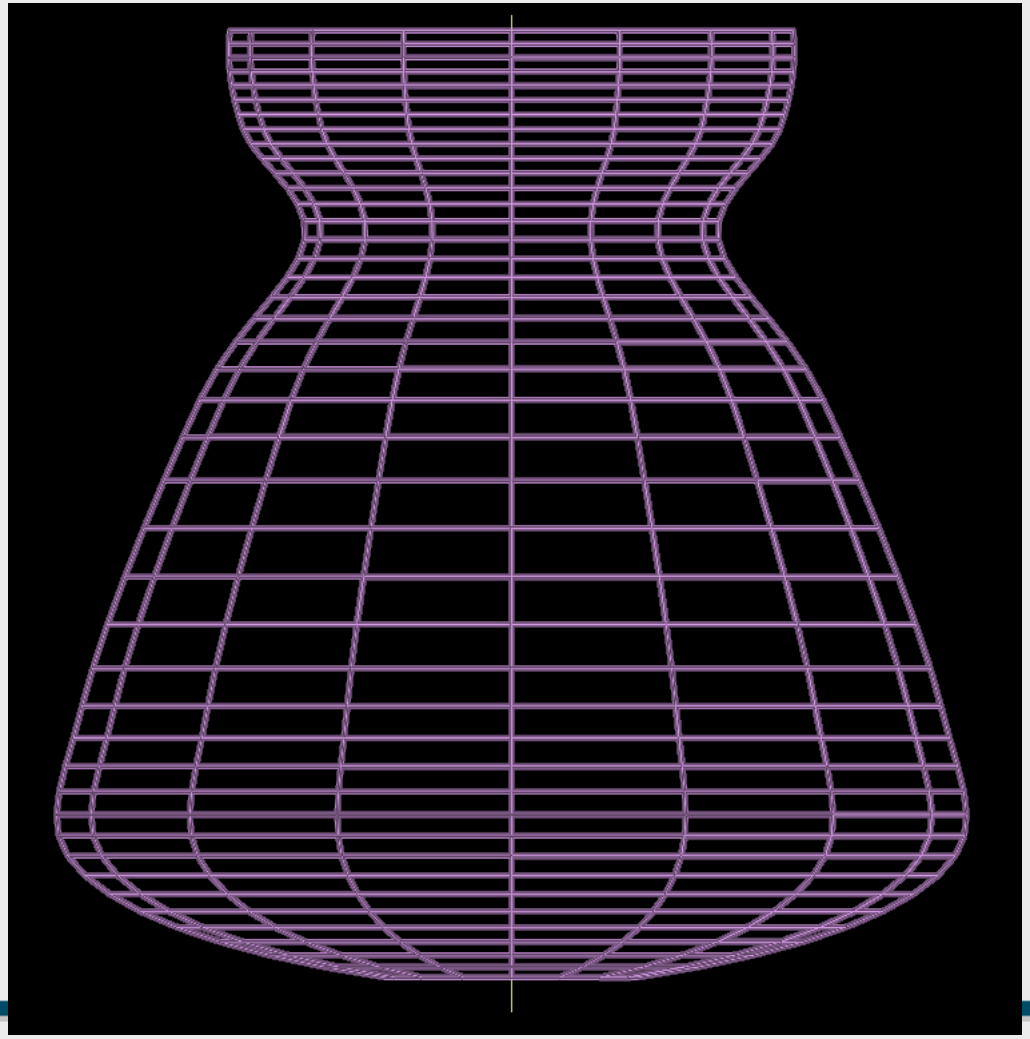
PARAMETRIC MODELING - LATHE

ROTATE CURVE AROUND AN AXIS



SURFACES - LATHE

ROTATE CURVE AROUND AN AXIS

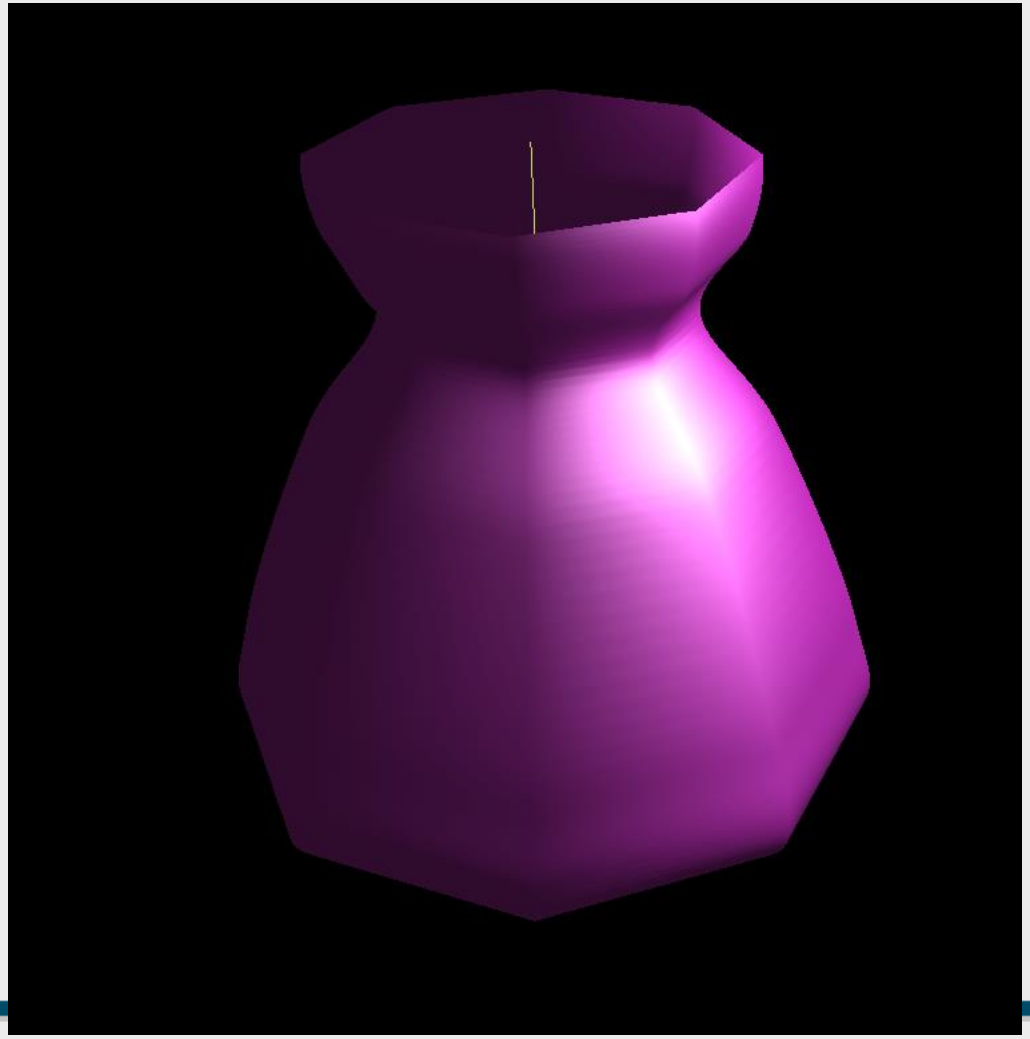


SURFACES - LATHE

ROTATE CURVE AROUND AN AXIS

SURFACES - LATHE

VARIABLE NUMBER OF STEPS - SMOOTHNESS



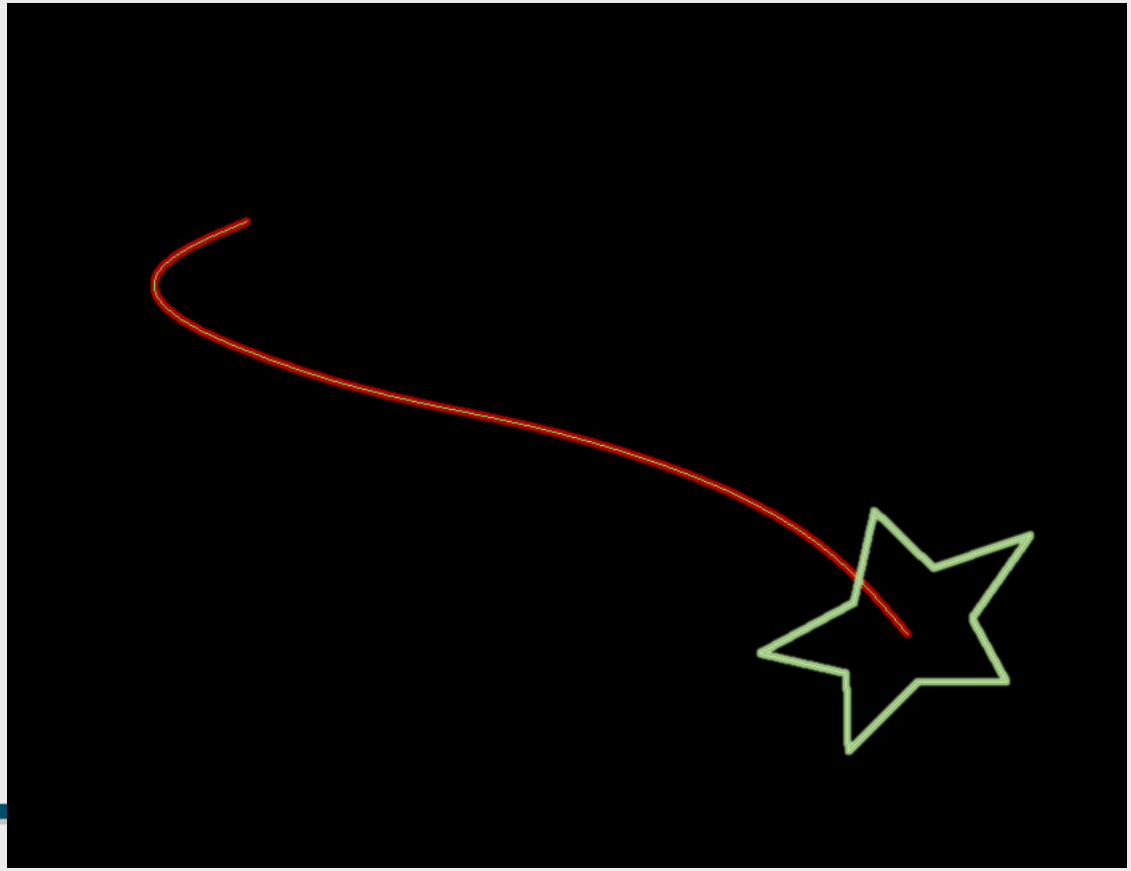
SURFACES - LATHE

VARIABLE NUMBER OF STEPS - SMOOTHNESS

SURFACES - LOFT

TRANSLATE CURVE ALONG ANOTHER CURVE

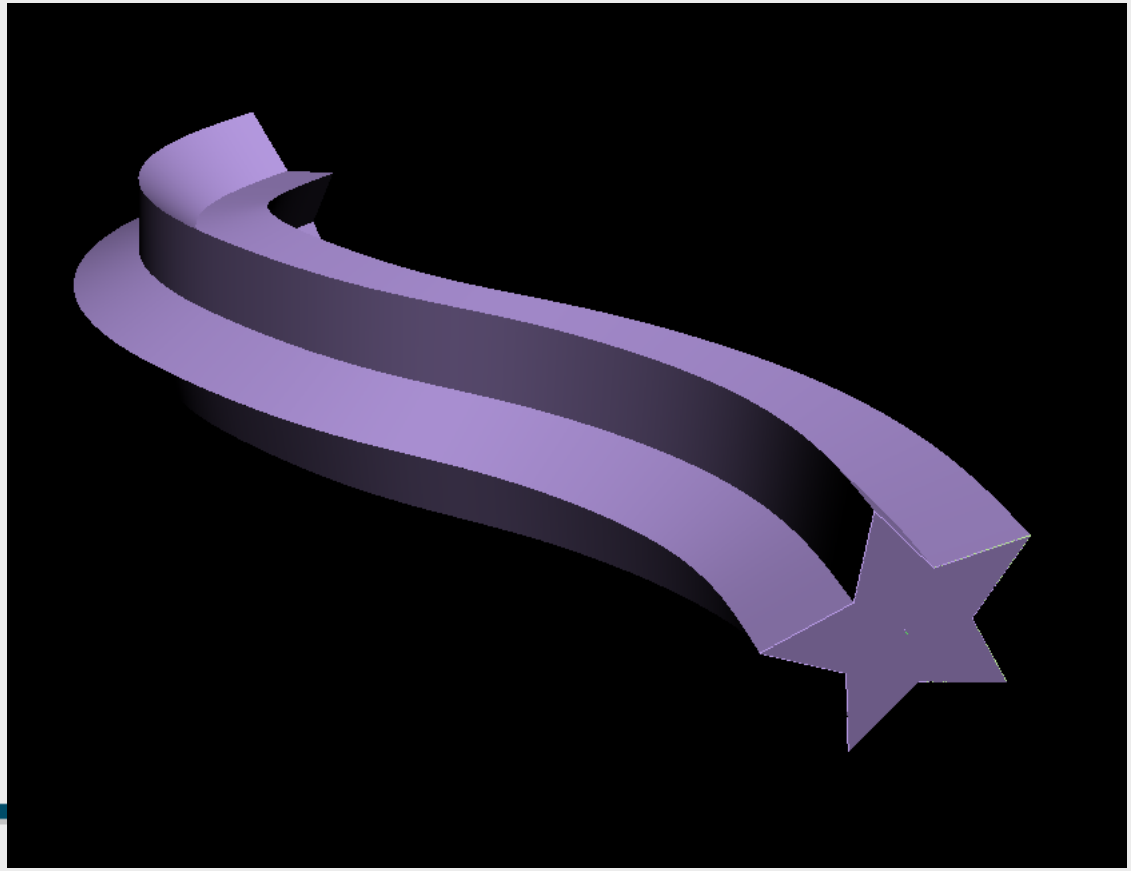
ROTATE OR SCALE DURING TRANSLATION



SURFACES - LOFT

TRANSLATE CURVE ALONG ANOTHER CURVE

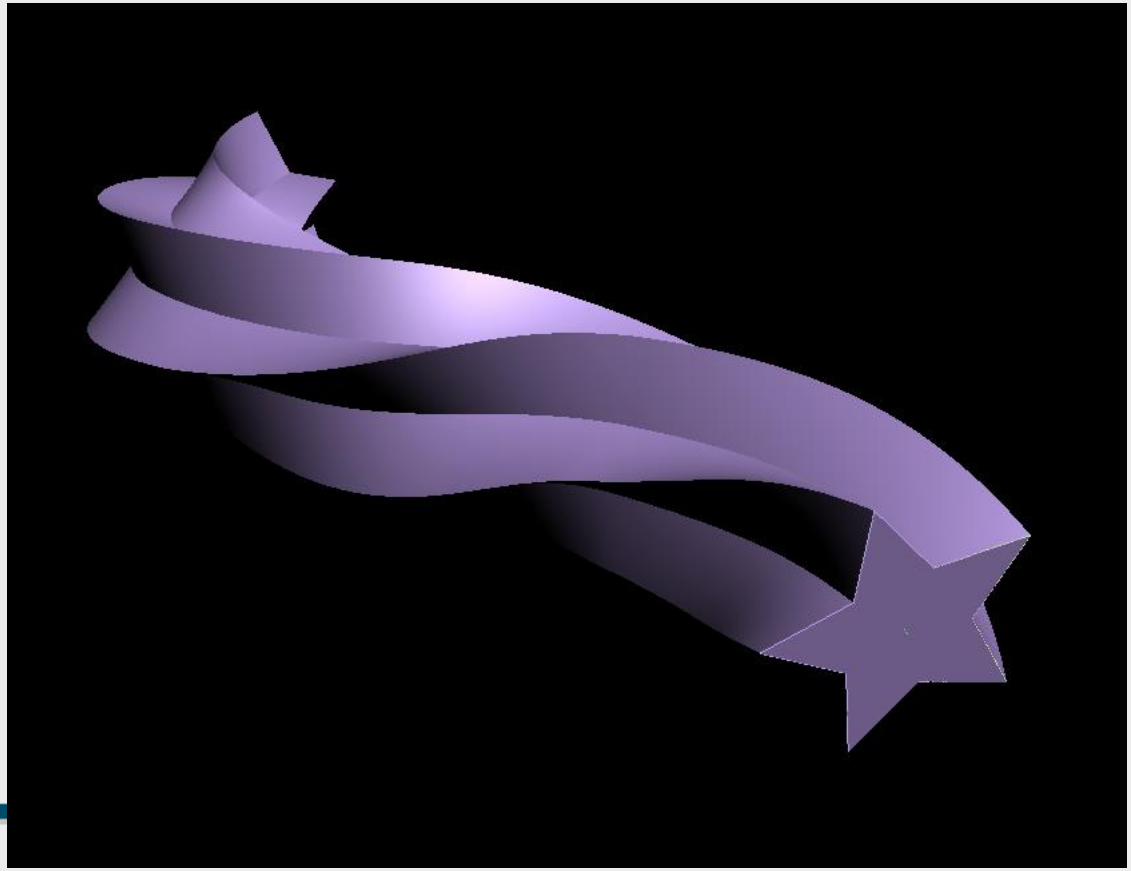
ROTATE OR SCALE DURING TRANSLATION



SURFACES - LOFT

TRANSLATE CURVE ALONG ANOTHER CURVE

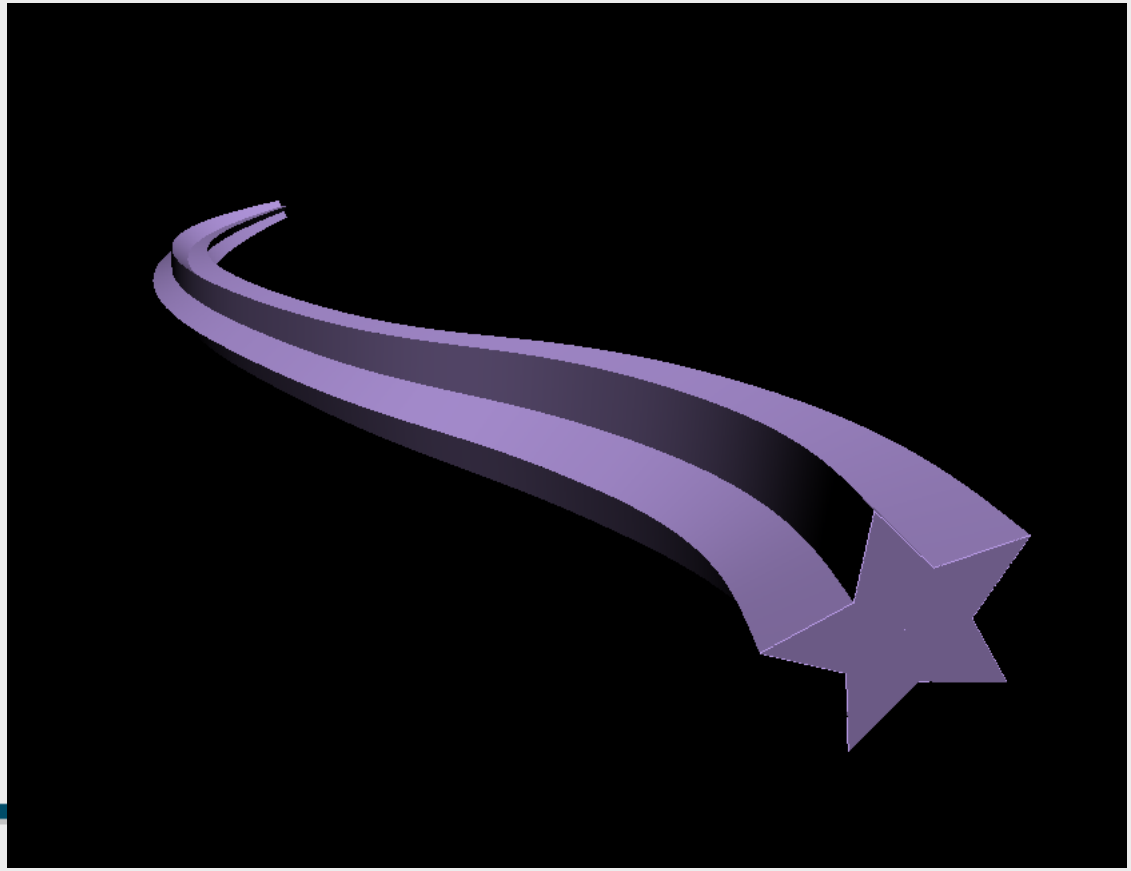
ROTATE OR SCALE DURING TRANSLATION



SURFACES - LOFT

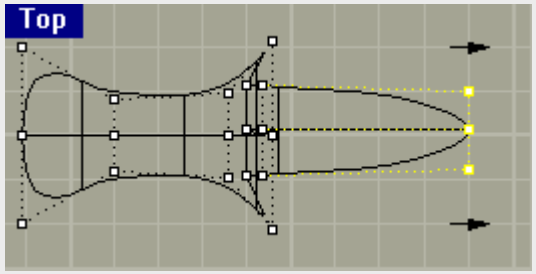
TRANSLATE CURVE ALONG ANOTHER CURVE

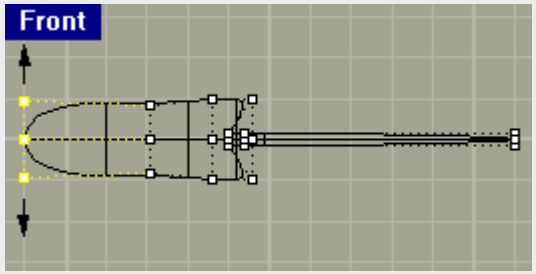
ROTATE OR SCALE DURING TRANSLATION

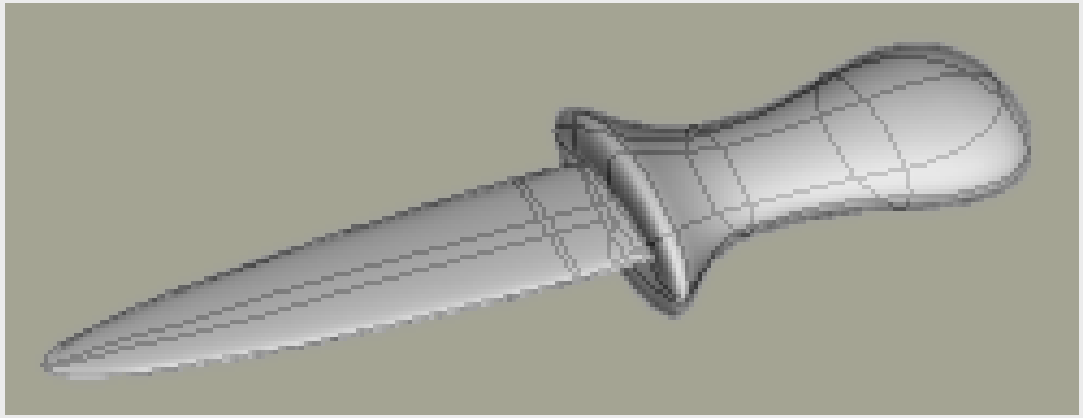


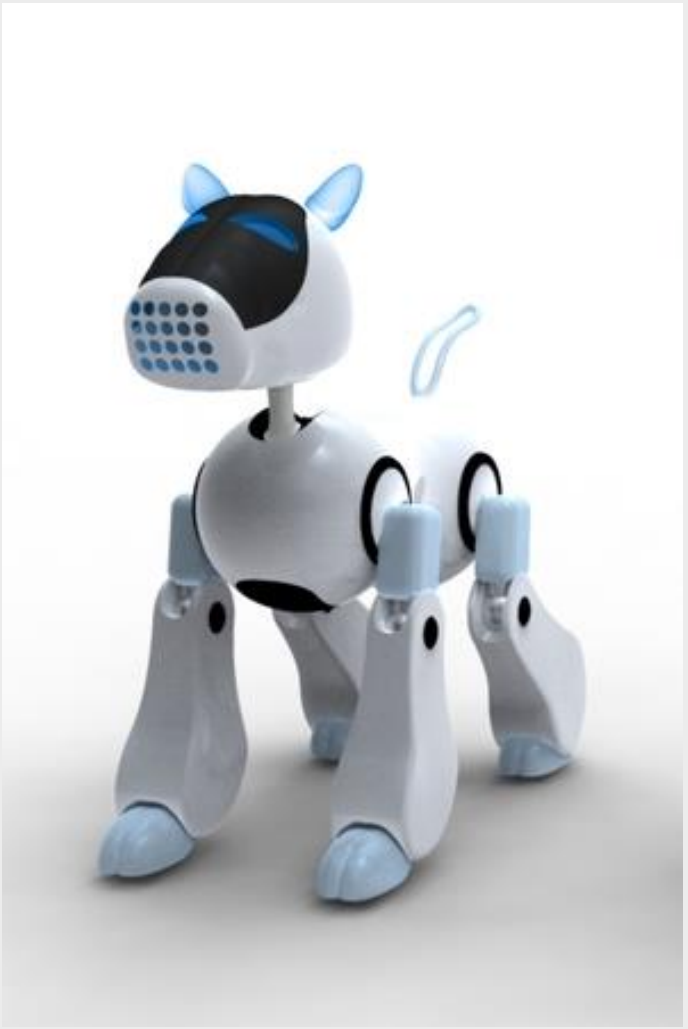
NURBS MODELING

PARAMETRIC SURFACE CONTROLLED BY POINTS AND CURVES





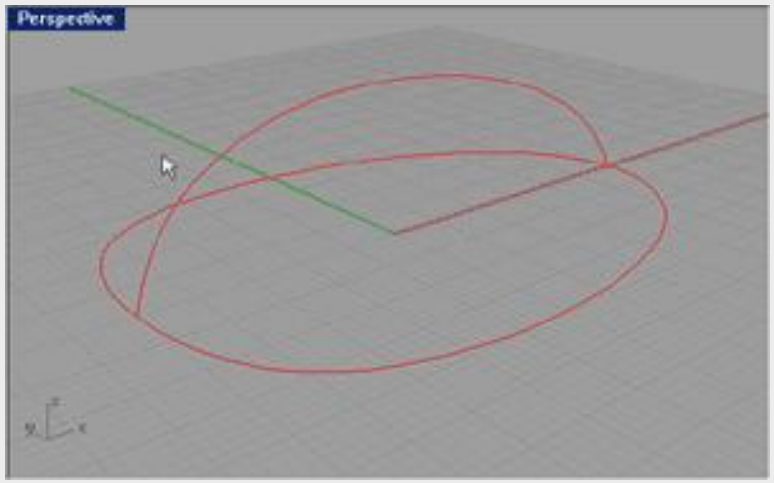


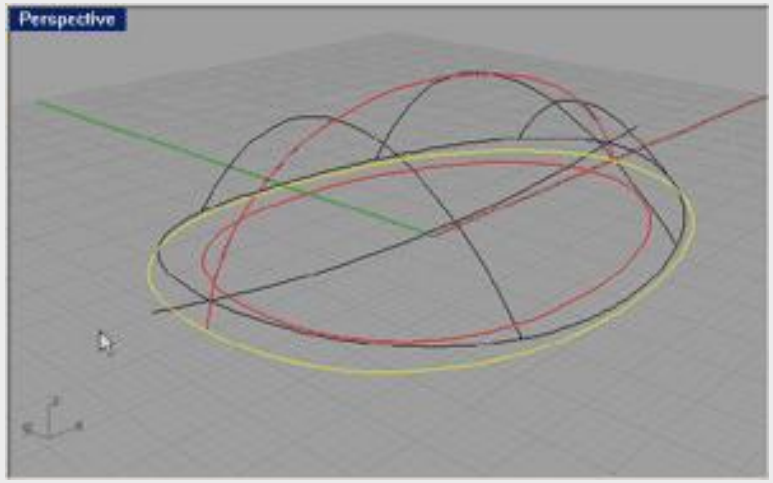


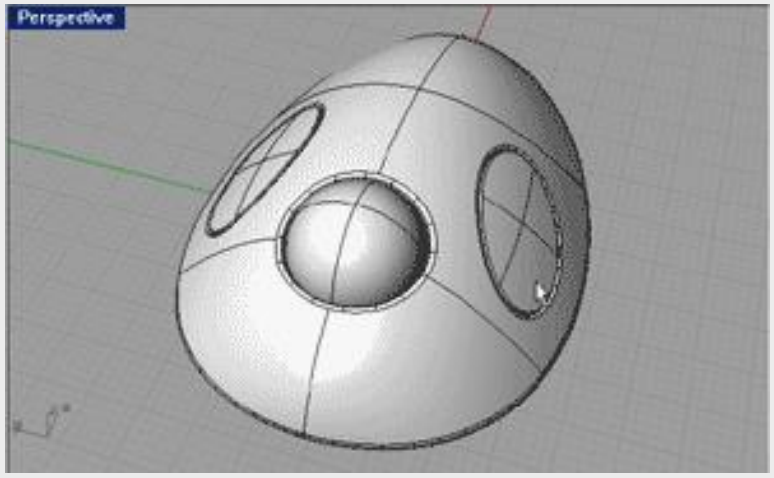
3d.pagesperso-orange.fr/tutorials/knife/knife.html

gallery.rhino3d.com

RHINO 3D







http://www.aversis.be/tutorials/rhinoceros/rhino_trackball_01.htm

MODELING REAL WORLD PHENOMENA

PLANTS, TREES

L-SYSTEMS
PARAMETRIC
PROCEDURAL
TREE ROOT
BRANCHING RULES

www.vf.utwente.nl/~schooten/povray/

www.sccg.sk/~smolenova/groimp/groimp.htm

EXAMPLE

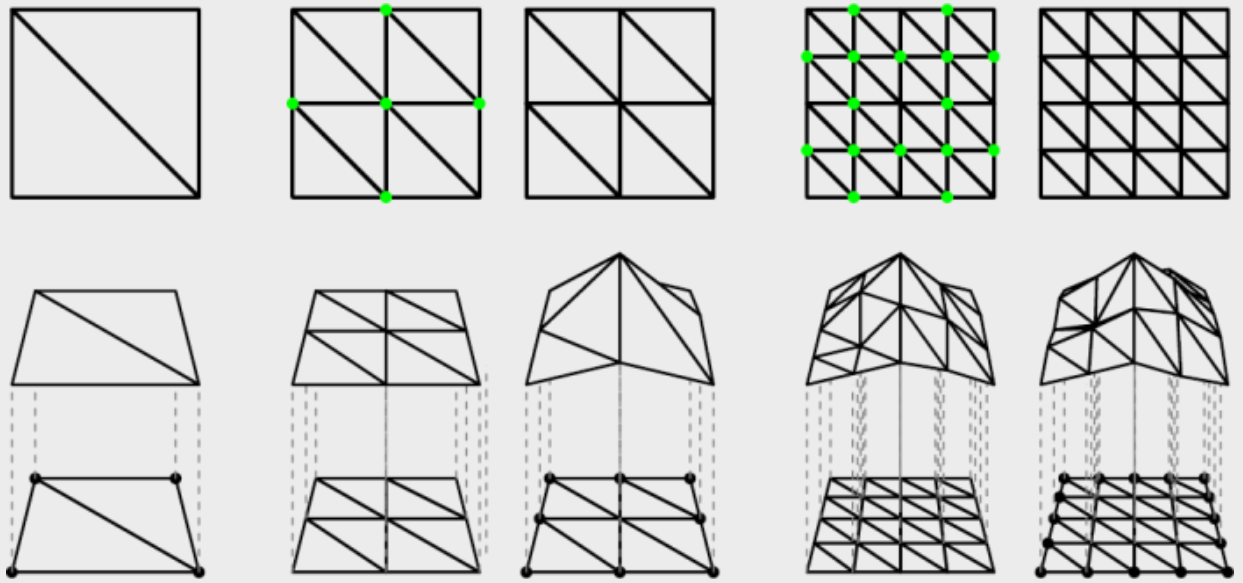
GROWFX, SPEEDTREE

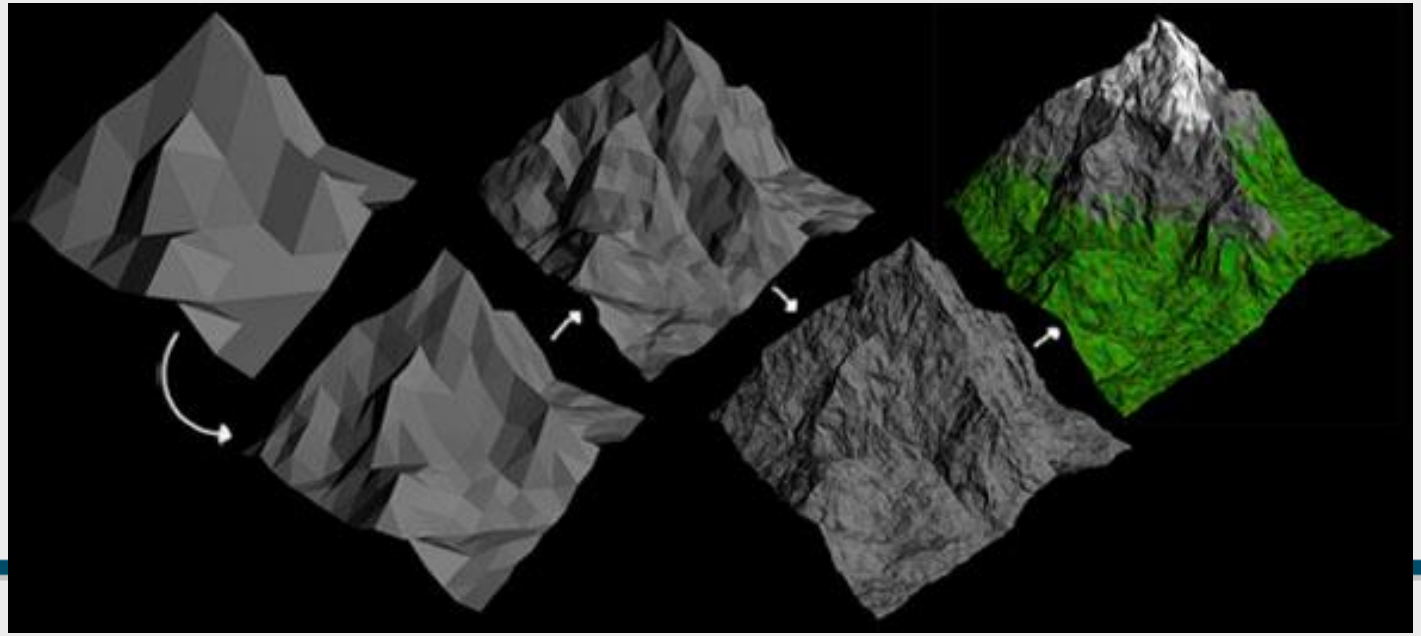
FRACTAL MOUNTAINS

MIDPOINT DISPLACEMENT

+

NOISE





LANDSCAPE GENERATION

Terragen, http://planetside.co.uk/

OTHER PHENOMENA

WATER, LIQUIDS
SAND, DUST, POWDER
EROSION, MELTING
GROWTH
FABRIC
HAIR, FUR

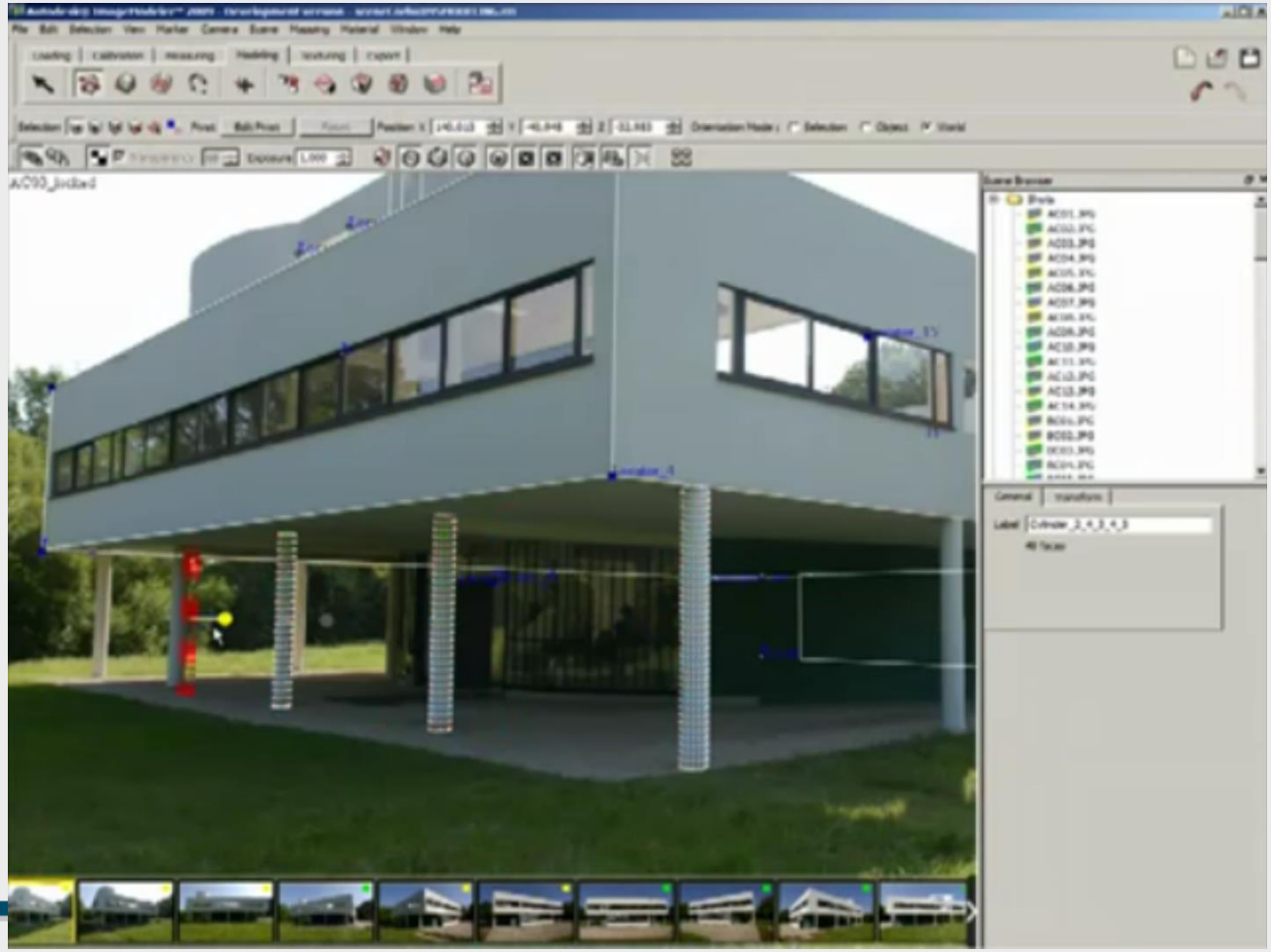
...

USUALLY COMBINED
WITH ANIMATION

3D DATA ACQUISITION

PHOTOGRAMMETRY

RECONSTRUCT 3D MODEL FROM PHOTOGRAPHS (AT LEAST 2 REQUIRED)



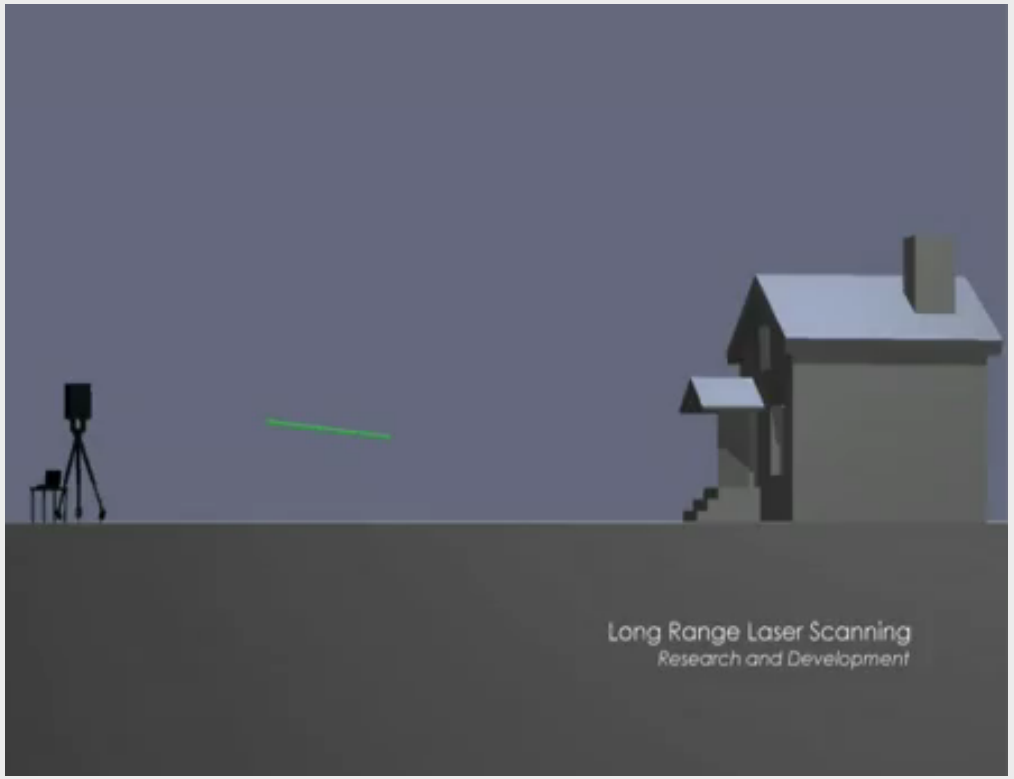
SCANNING

LASER SCANNING
Point cloud, contours

3D PROBES

LASER STRIPING

www.david-laserscanner.com/



www.youtube.com/watch?v=_NxCfYkPYBI

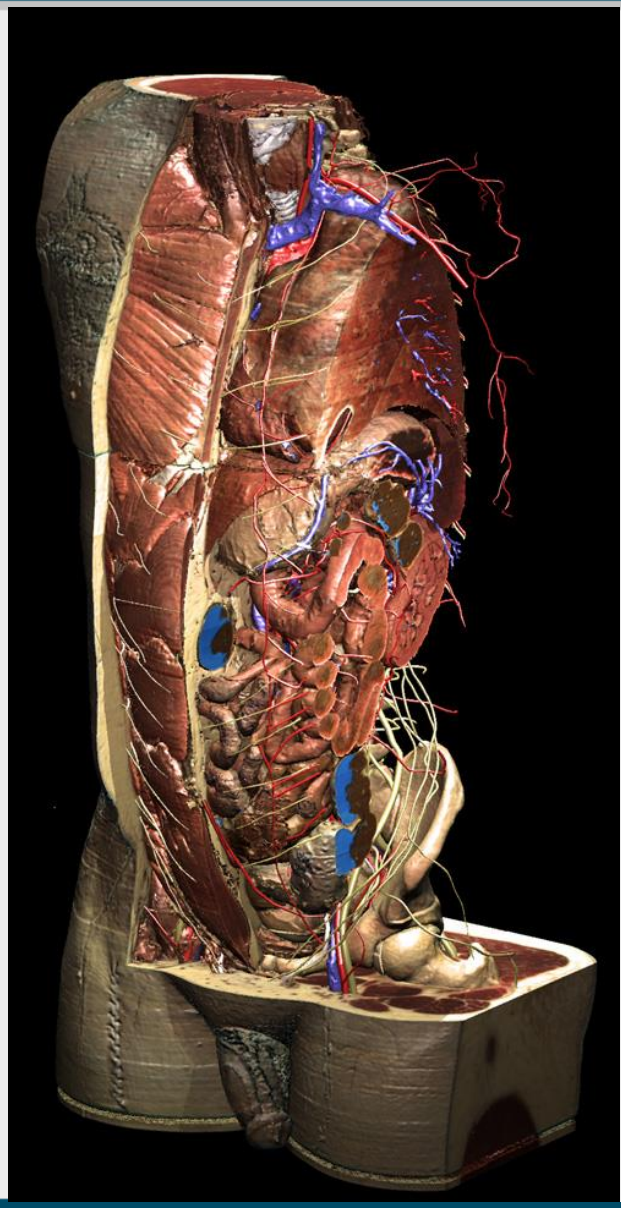
MEDICAL DATA SCANNING

CT, MRI -> SET OF 2D PICTURES
Pixels

REGISTRATION (ALIGN IMAGES)
Voxels

SEGMENTATION
Which voxels = which organ?

(OPTIONAL) CONVERSION TO POLYGONAL MODEL



www.voxel-man.de/gallery/visible_human/inner_organs/

MEDICAL DATA

ORIGINAL DATA
CONTAINS DENSITY INFO

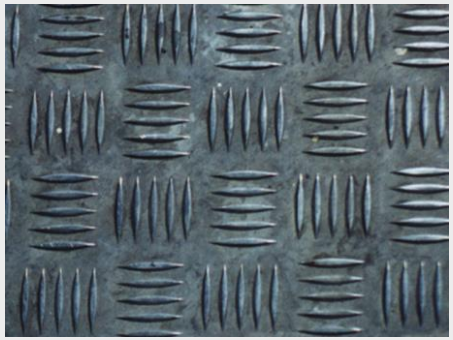
DENSITY -> GRAY VALUE

MATERIALS

TEXTURE

USED TO DEFINE OBJECT COLOR

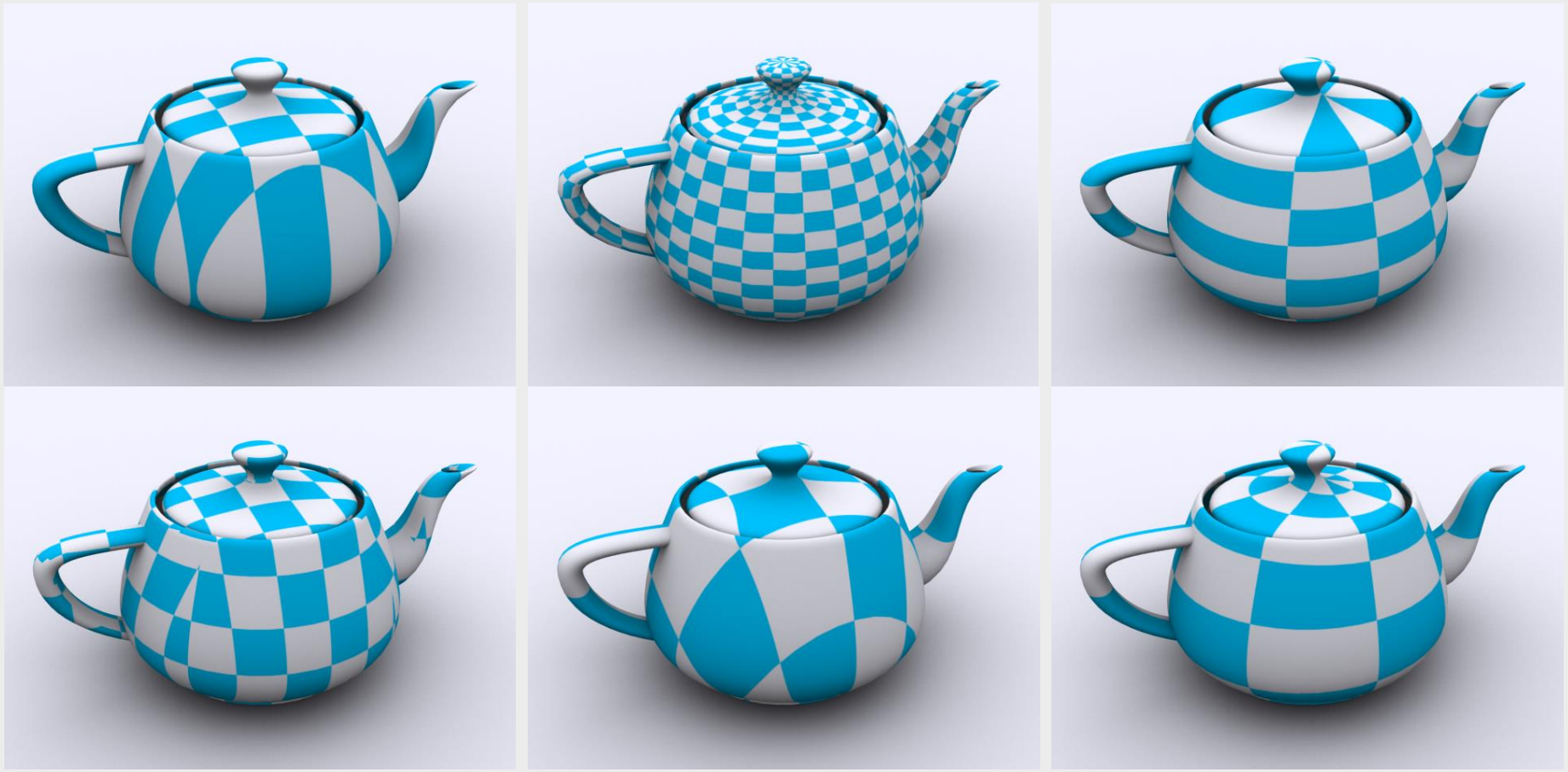
IMAGE TEXTURE



PROCEDURAL TEXTURE

i.e. formula, algorithm

DIFFERENT UV MAPPINGS



TEXTURE USAGE

OBJECT DIFFUSE COLOR
patterns, decals

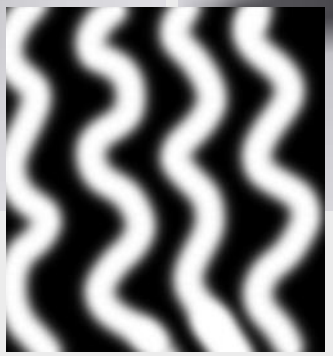
MODULATE SURFACE PROPERTIES
bumps, displacements

MODULATE LIGHTING PROPERTIES
e.g. shininess

SIMULATE PHYSICAL PHENOMENA
reflection, refraction, global illumination

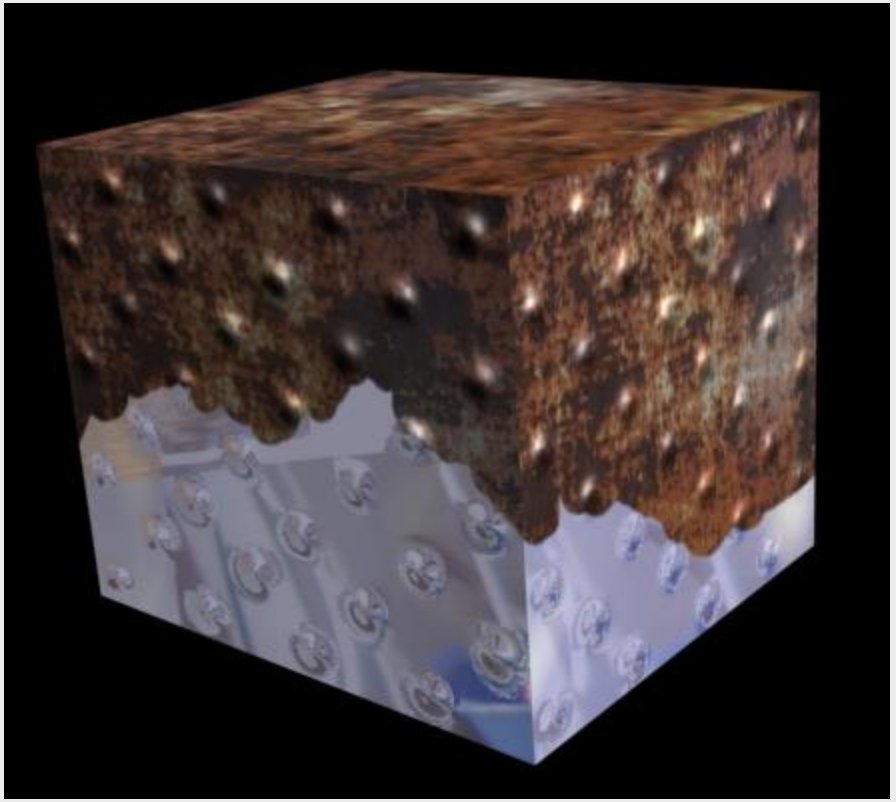
BUMP MAPPING EXAMPLE

COLOR INTENSITY = DIFFERENCE BETWEEN COMPLEX SURFACE AND SIMPLE MODEL



MULTITEXTURING

COMBINE MULTIPLE TEXTURES



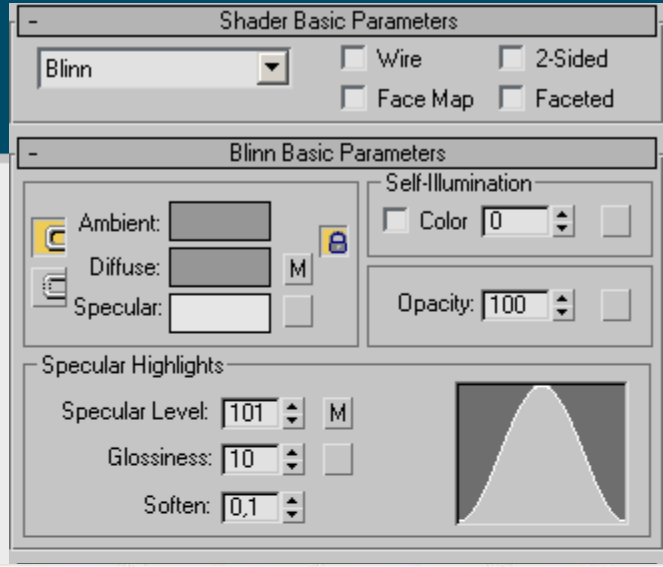
MATERIAL

TEXTURES

SHADERS

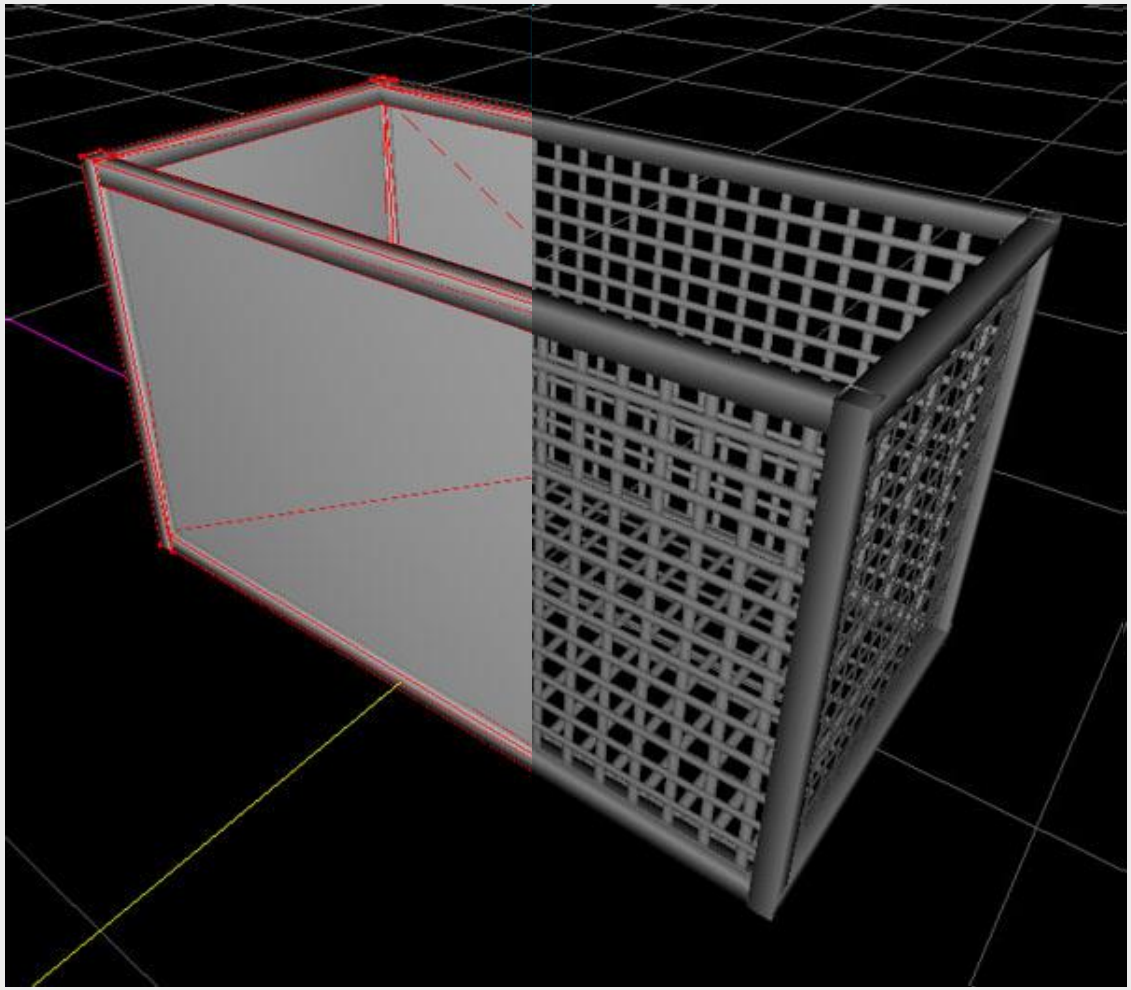
LIGHTING PARAMETERS

depend on light model
e.g. ambient, diffuse,
specular, shininess,
translucency,
reflectivity,
index of refraction ...



ALPHA CHANNEL

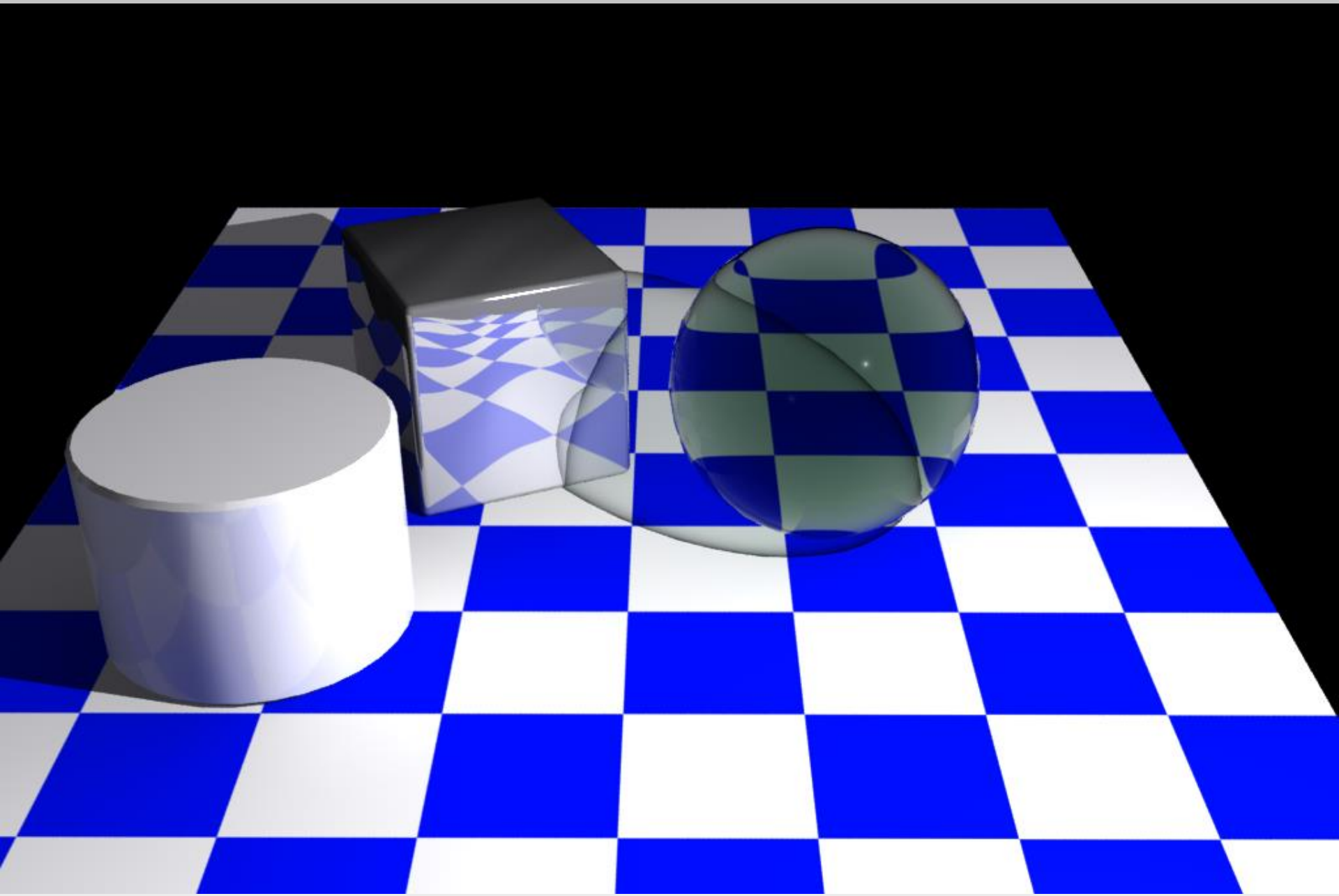
WHICH PARTS OF THE OBJECTS ARE TRANSPARENT (SEE-THROUGH)



TRANSPARENT MATERIALS

GLASS, PLASTIC
FAKE FINE GEOMETRY DETAILS OF
VEGETATION, GRIDS, WIRES, FENCES, ...

EXAMPLES OF MATERIALS



EXAMPLES OF MATERIALS

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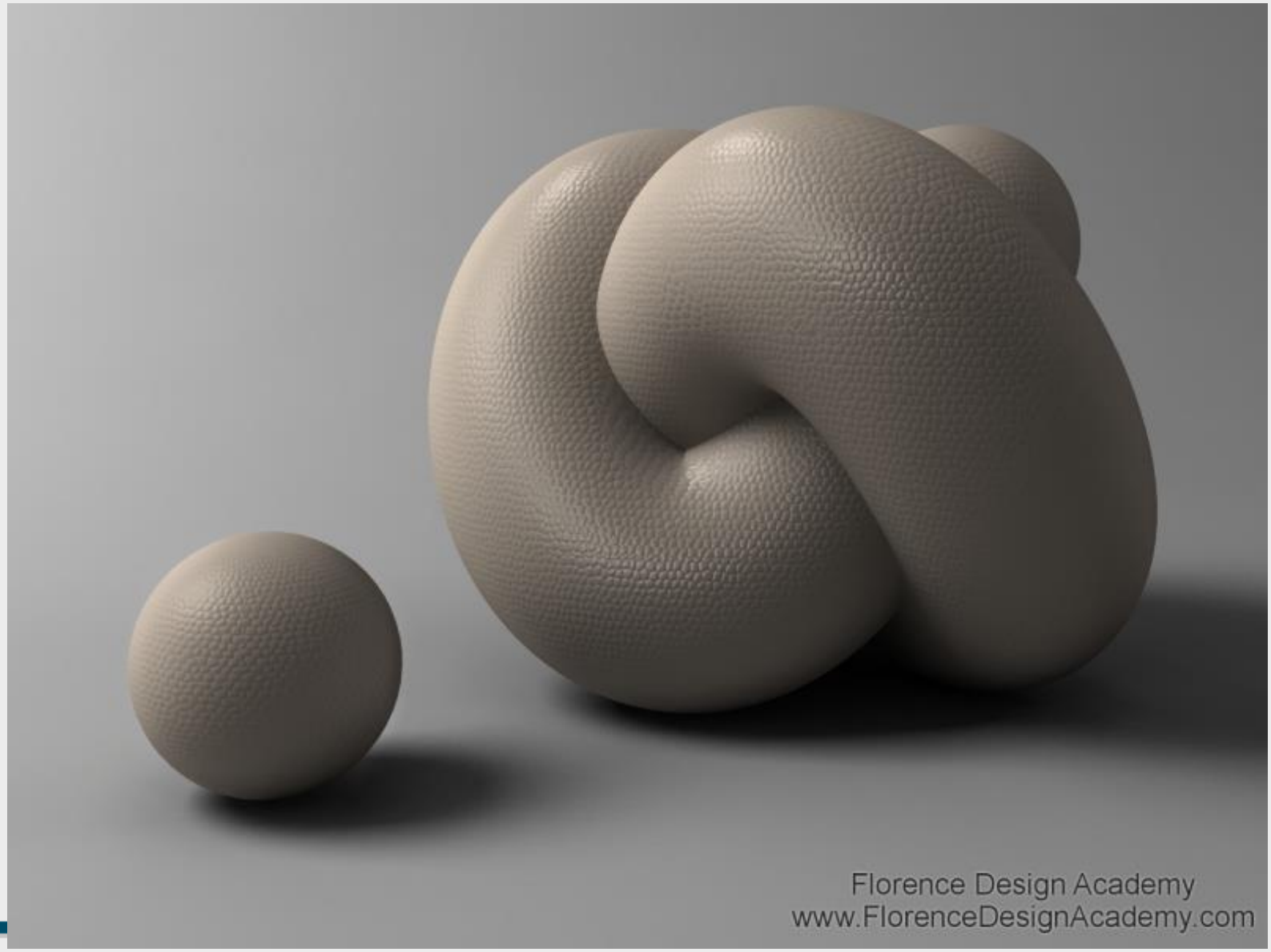
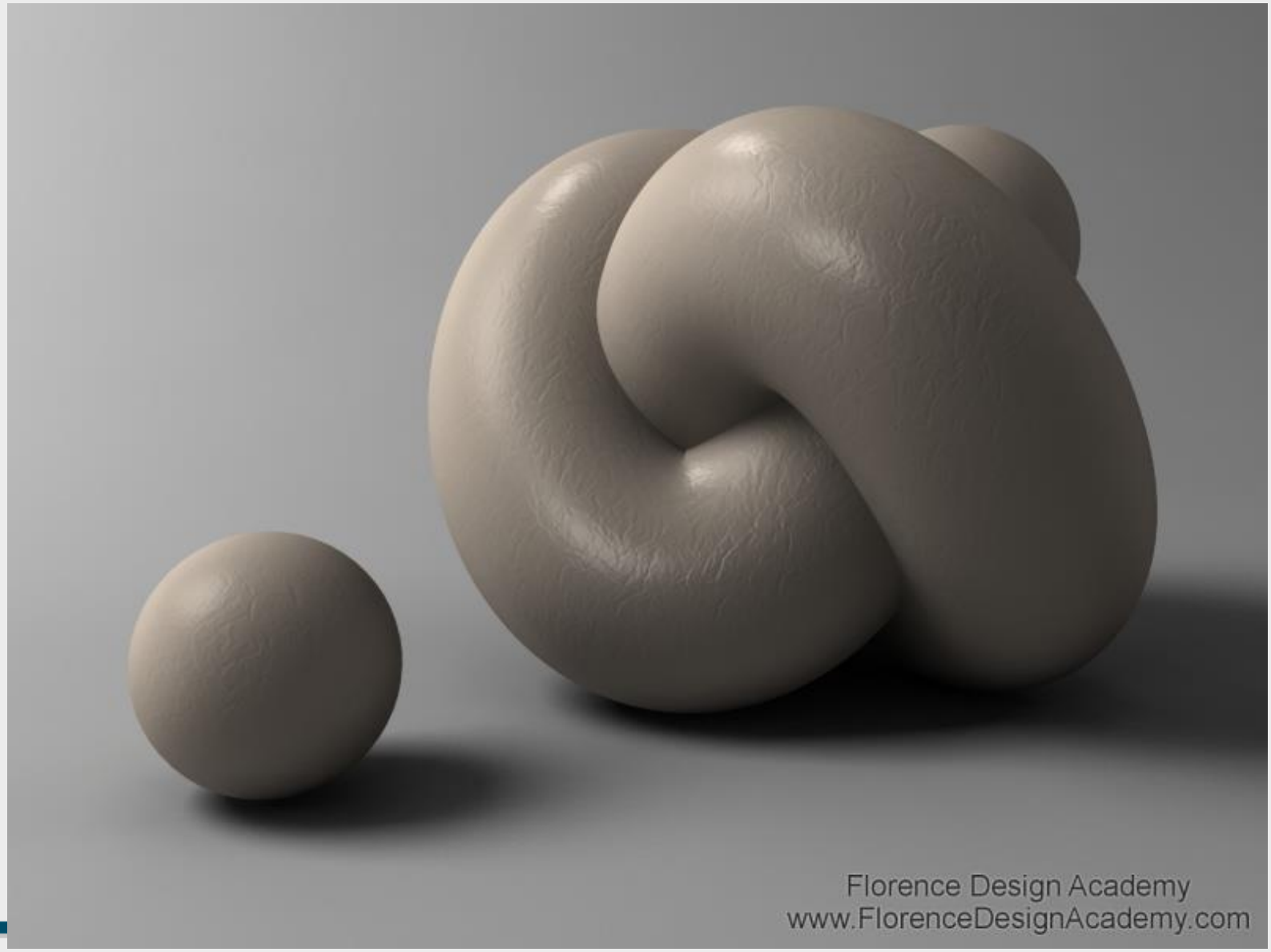


EXAMPLES OF MATERIALS



PHOTOREALISM

MULTITEXTURING

BUMP MAPPING

DISPLACEMENT MAPPING

SUBSURFACE SCATTERING

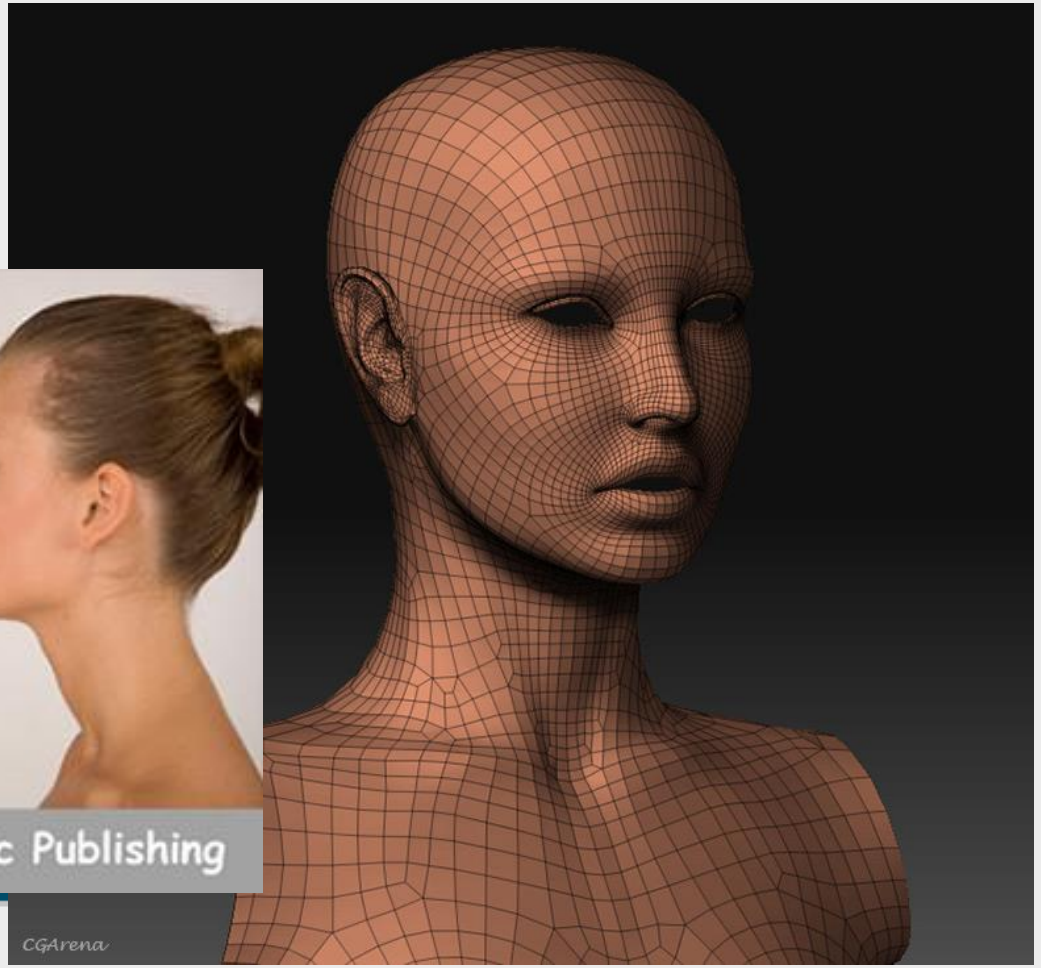
http://blenderartists.org/forum/showthread.php?t=137000&page=5

DEMO SESSION OF A 3D ARTIST

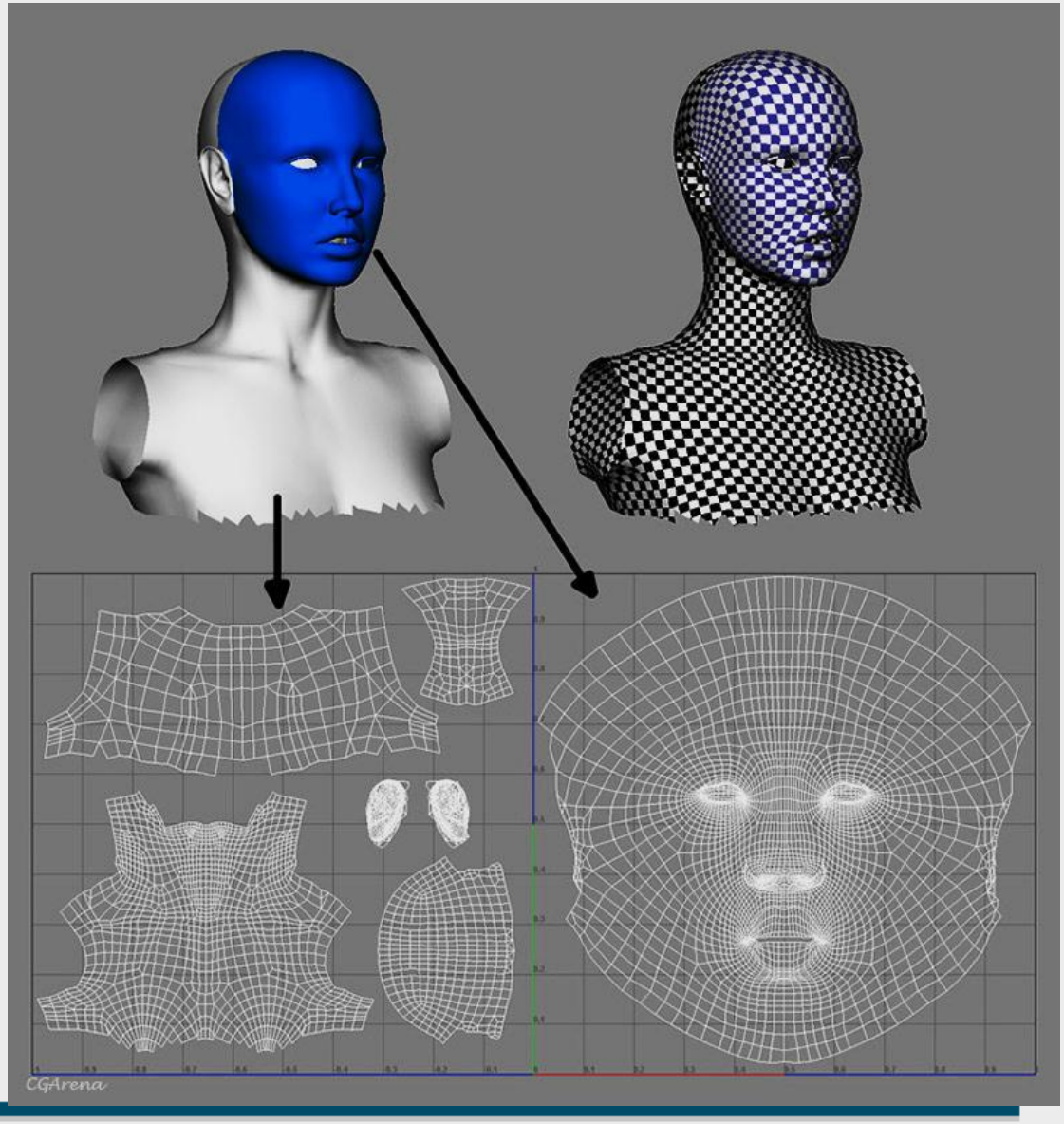
MAKING OF CLOSE-UP PORTRAITS

ww.davidmoratilla.com

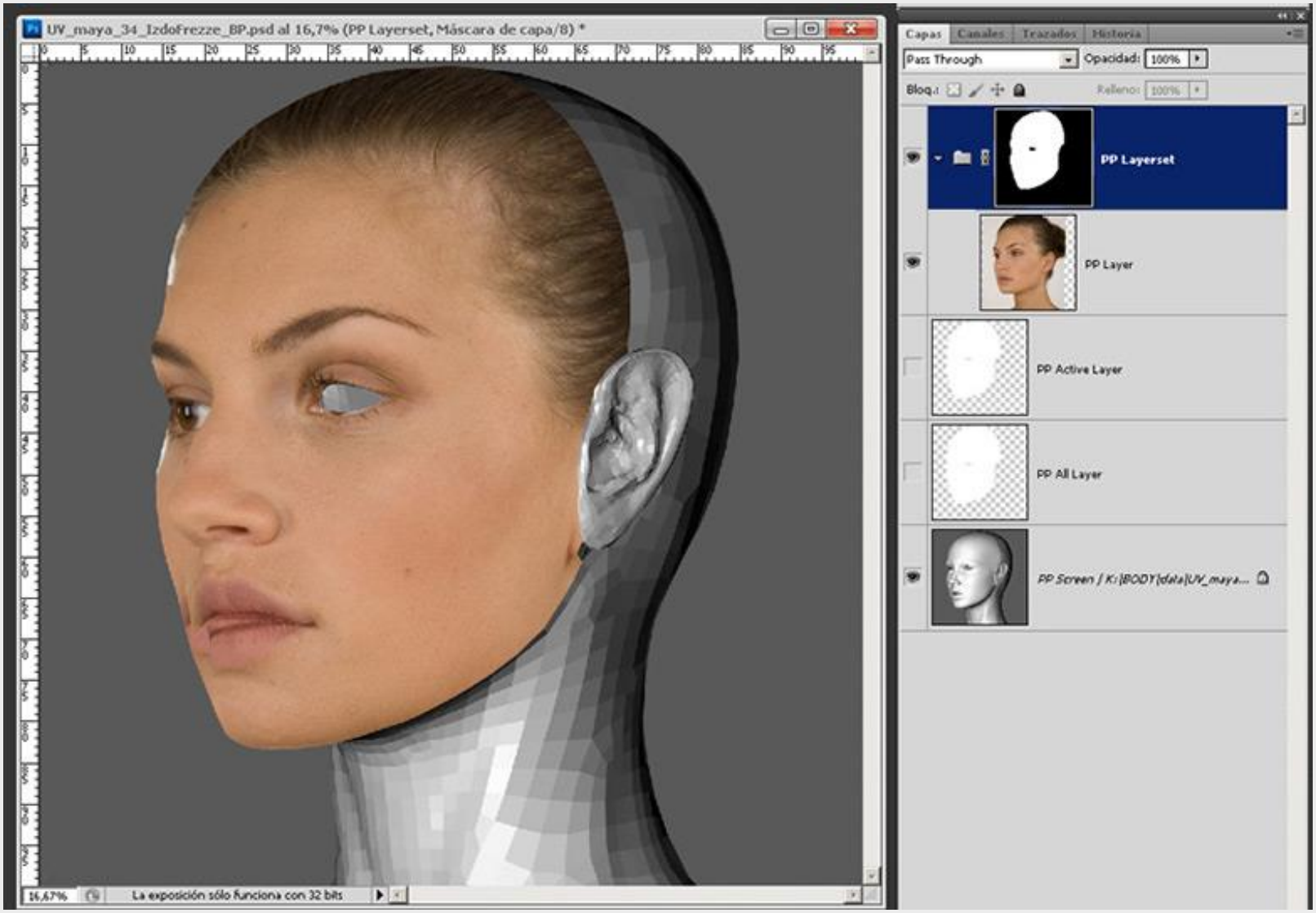
NURBS MODEL
REAL PHOTOS



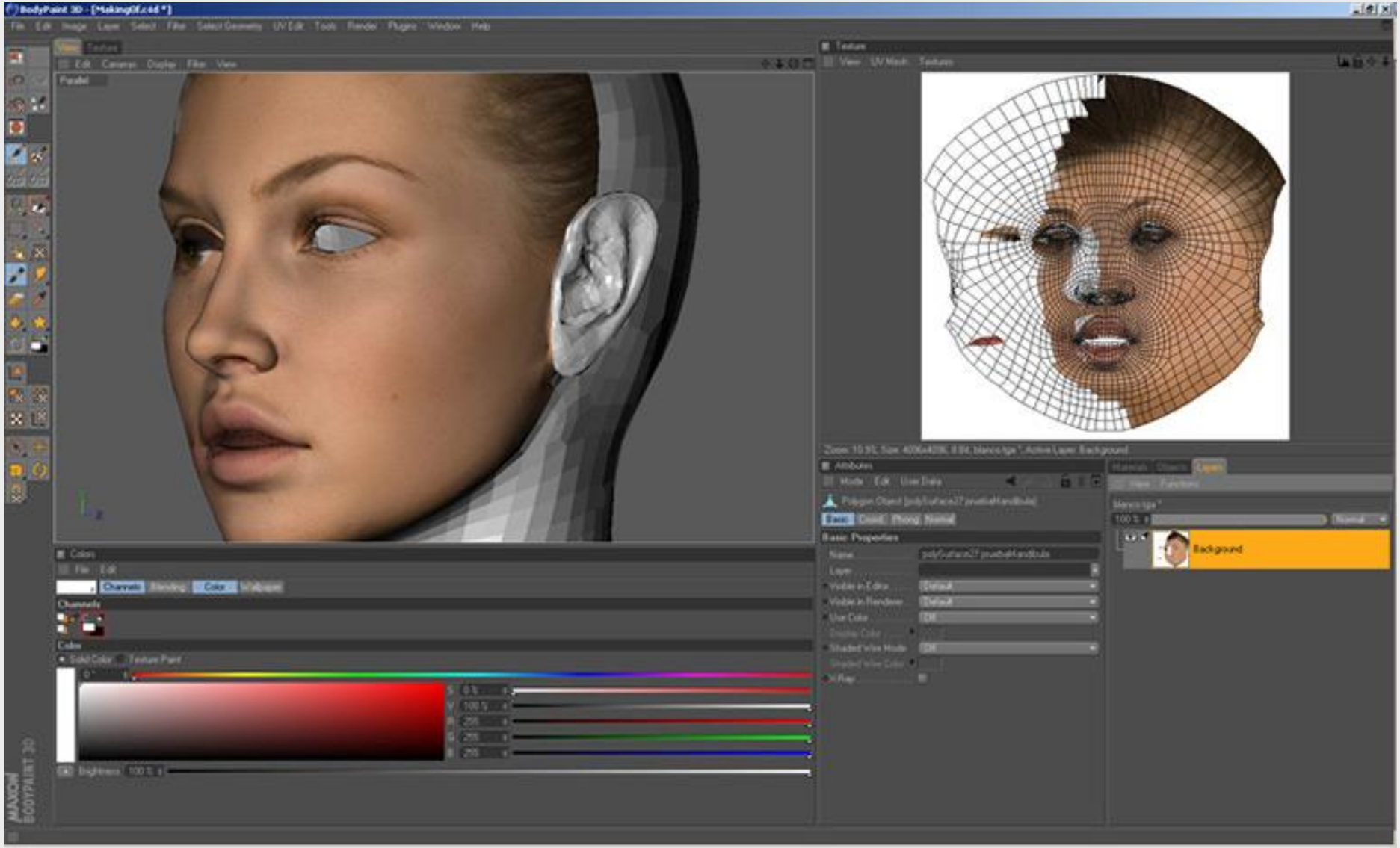
UNWRAP MODEL FOR TEXTURING



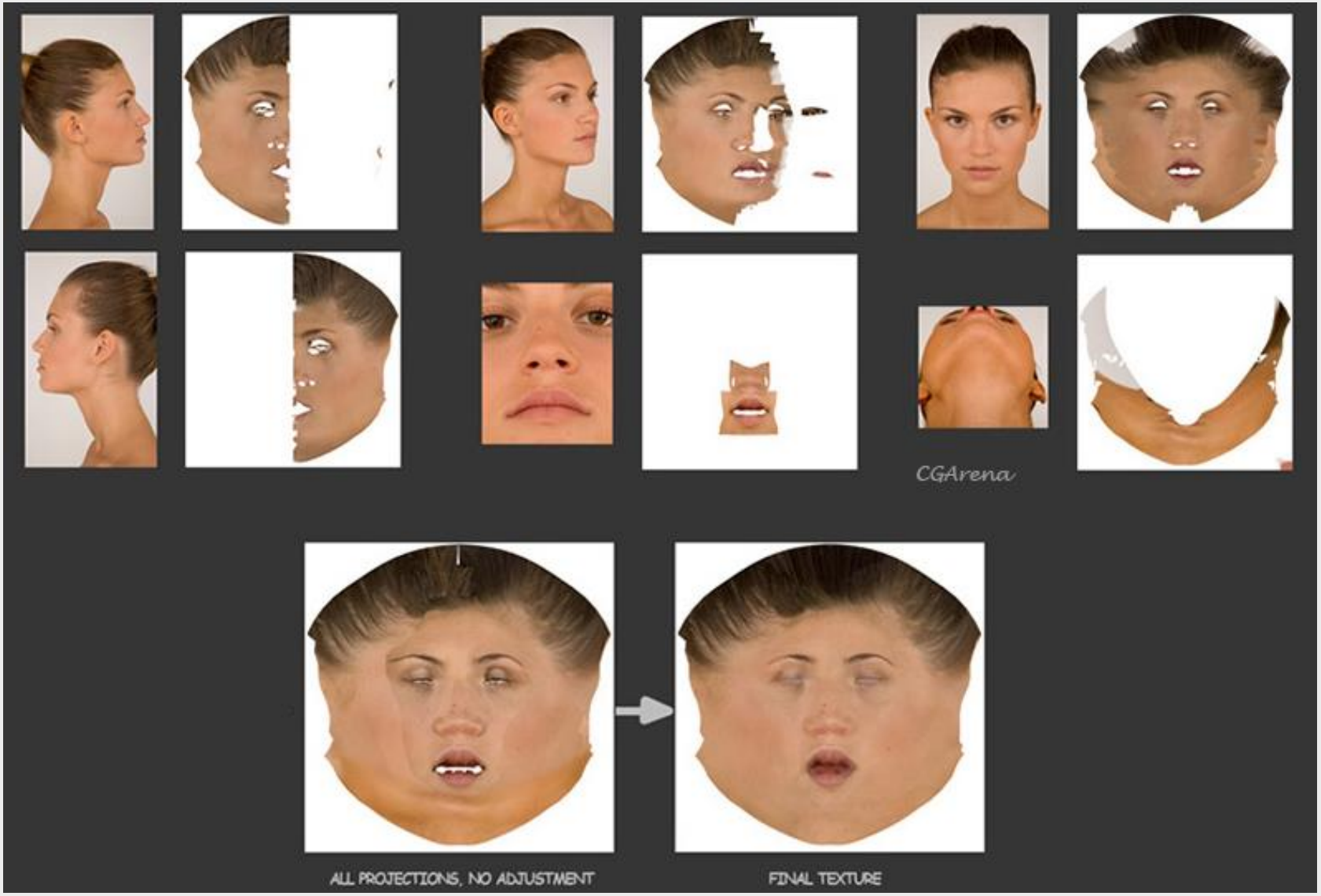
ALIGN MODEL WITH PHOTOS



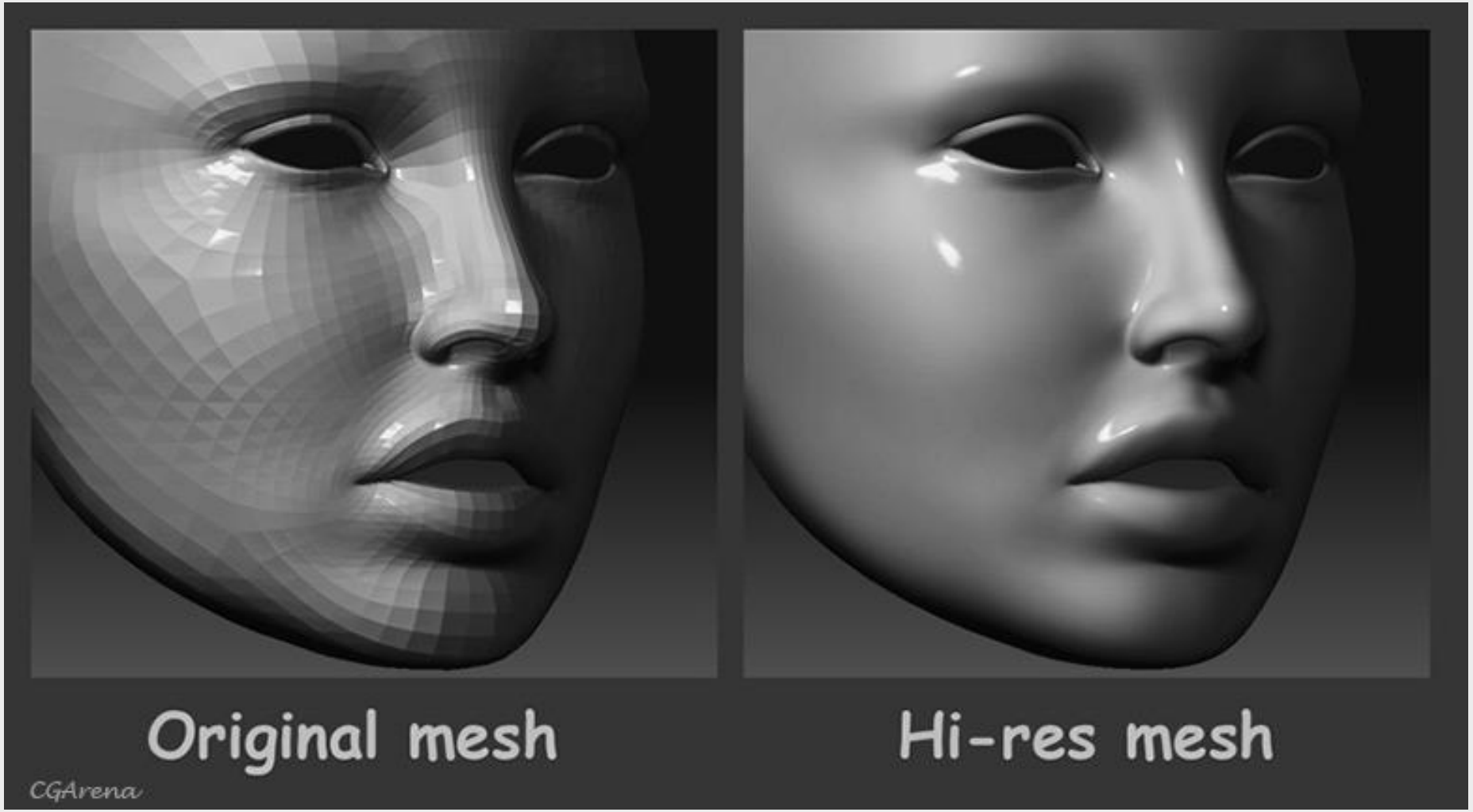
PROJECT THE PHOTO TO TEXTURE



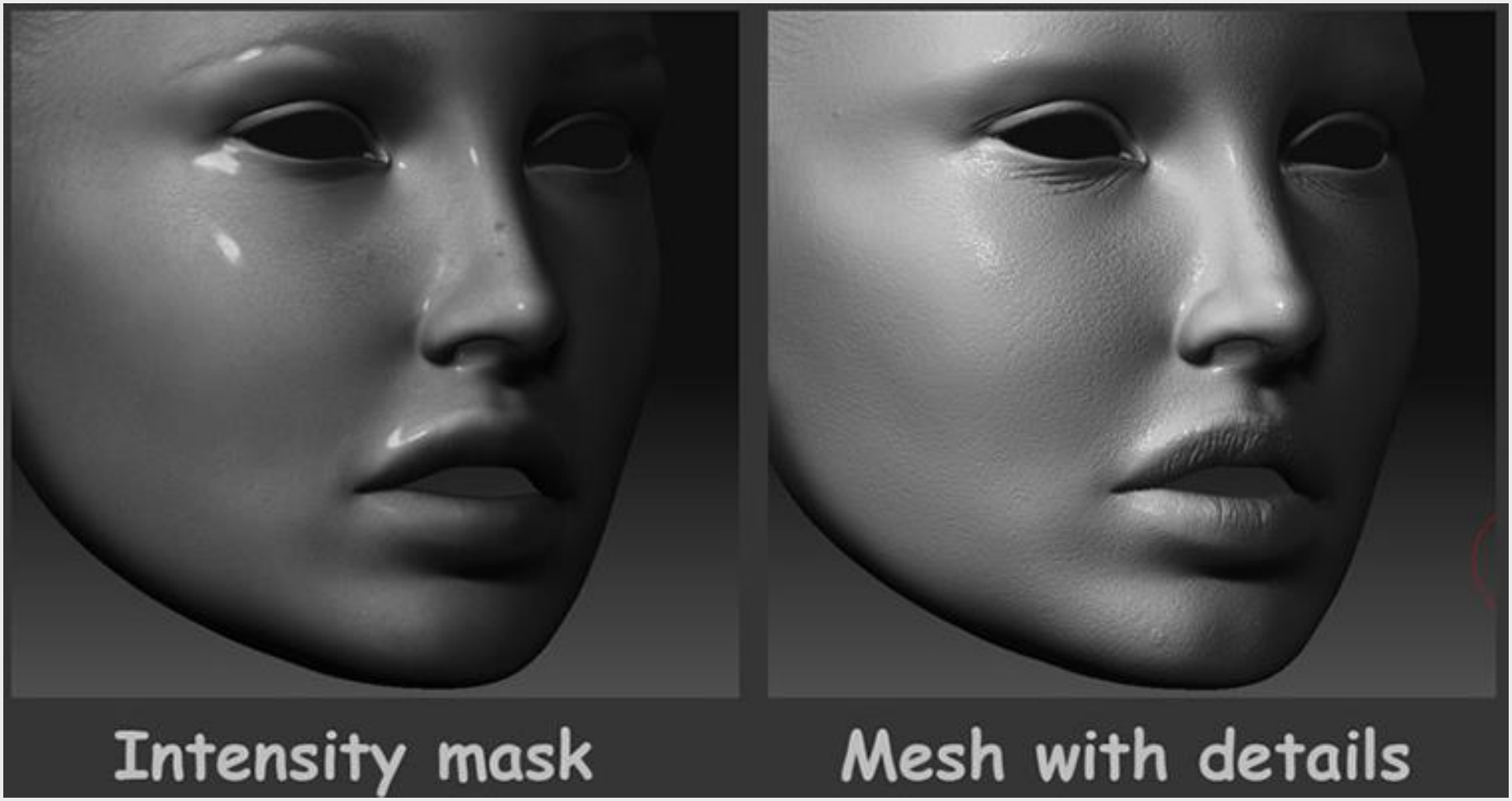
REPEAT FOR ALL SIDES OF MODEL



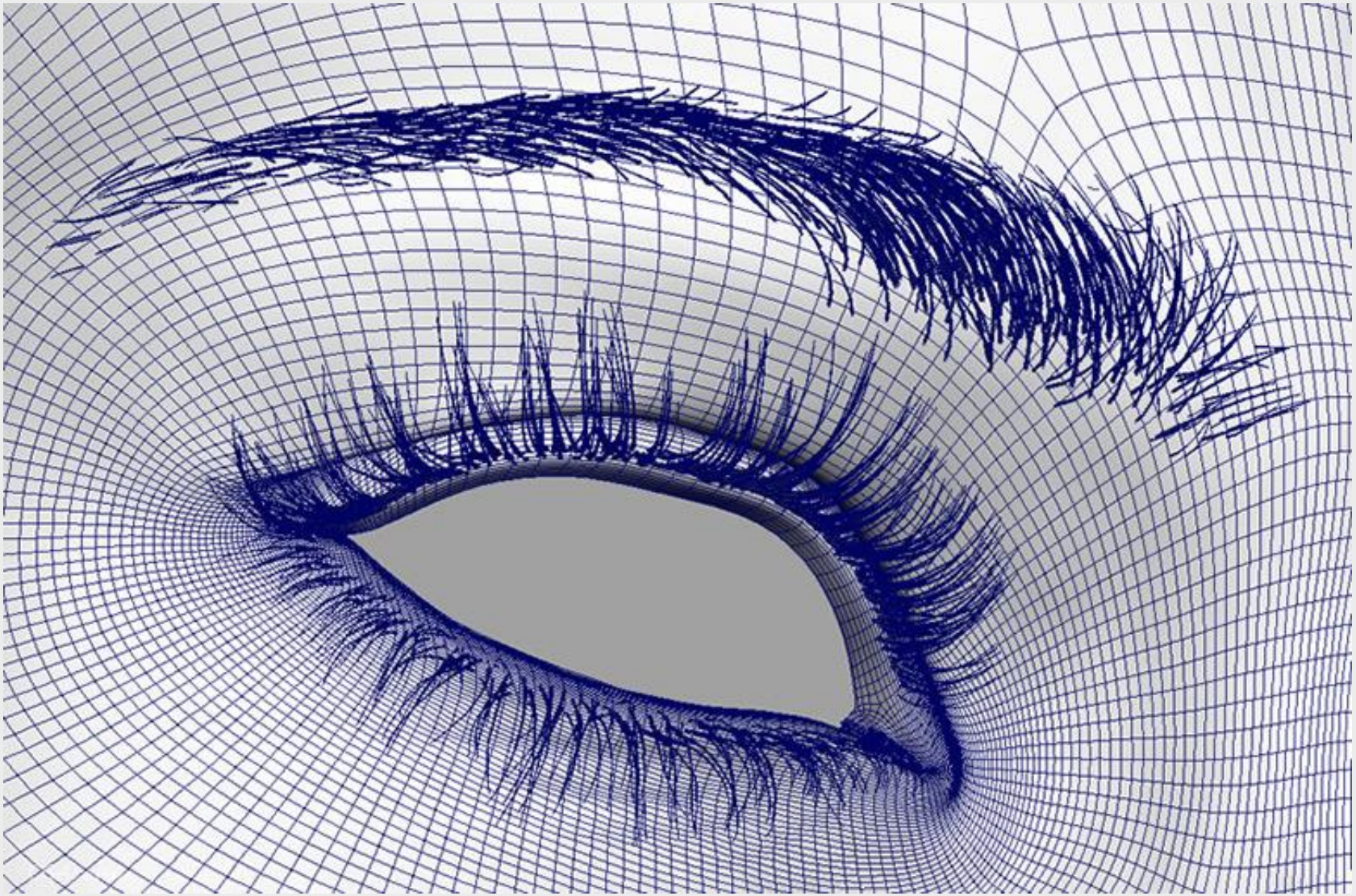
SUBDIVIDE MESH TO SMOOTH IT



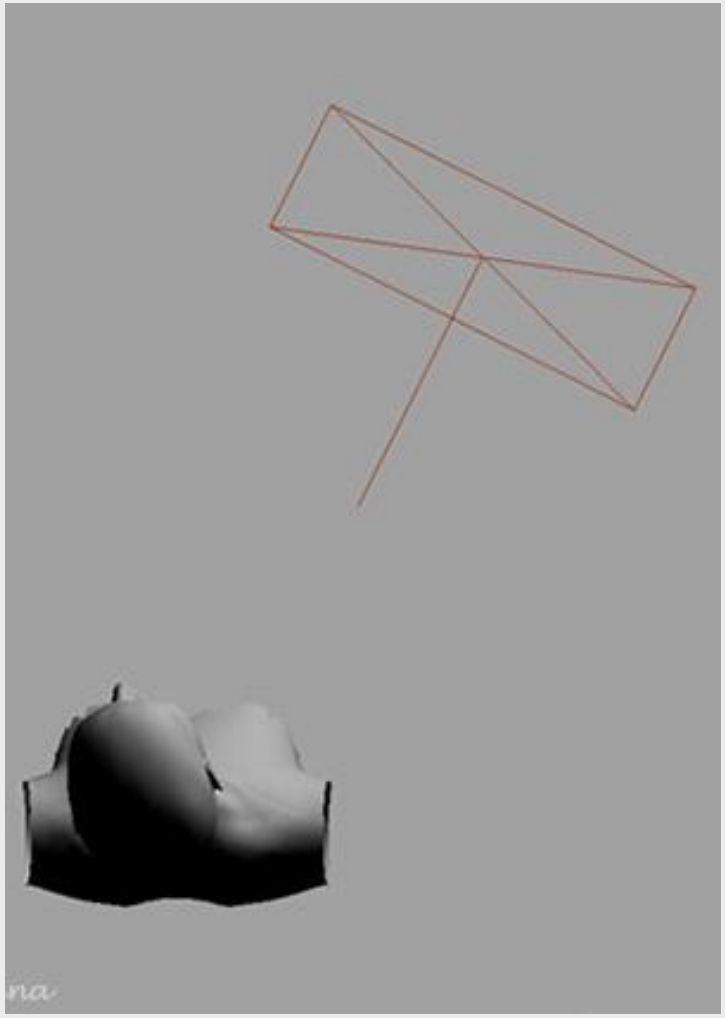
ADD DETAILS TO BUMP MAP

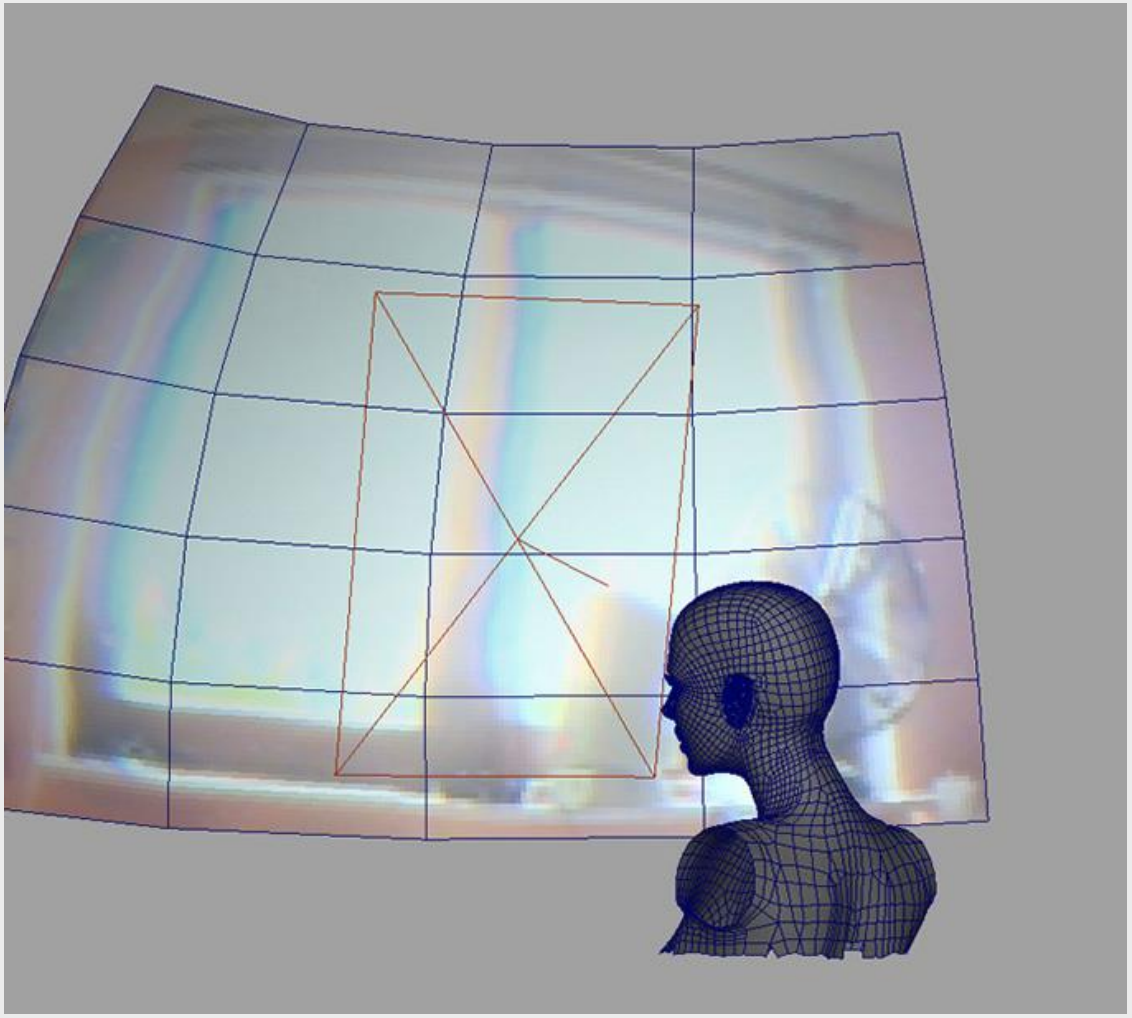


ADD DETAILS TO GEOMETRY

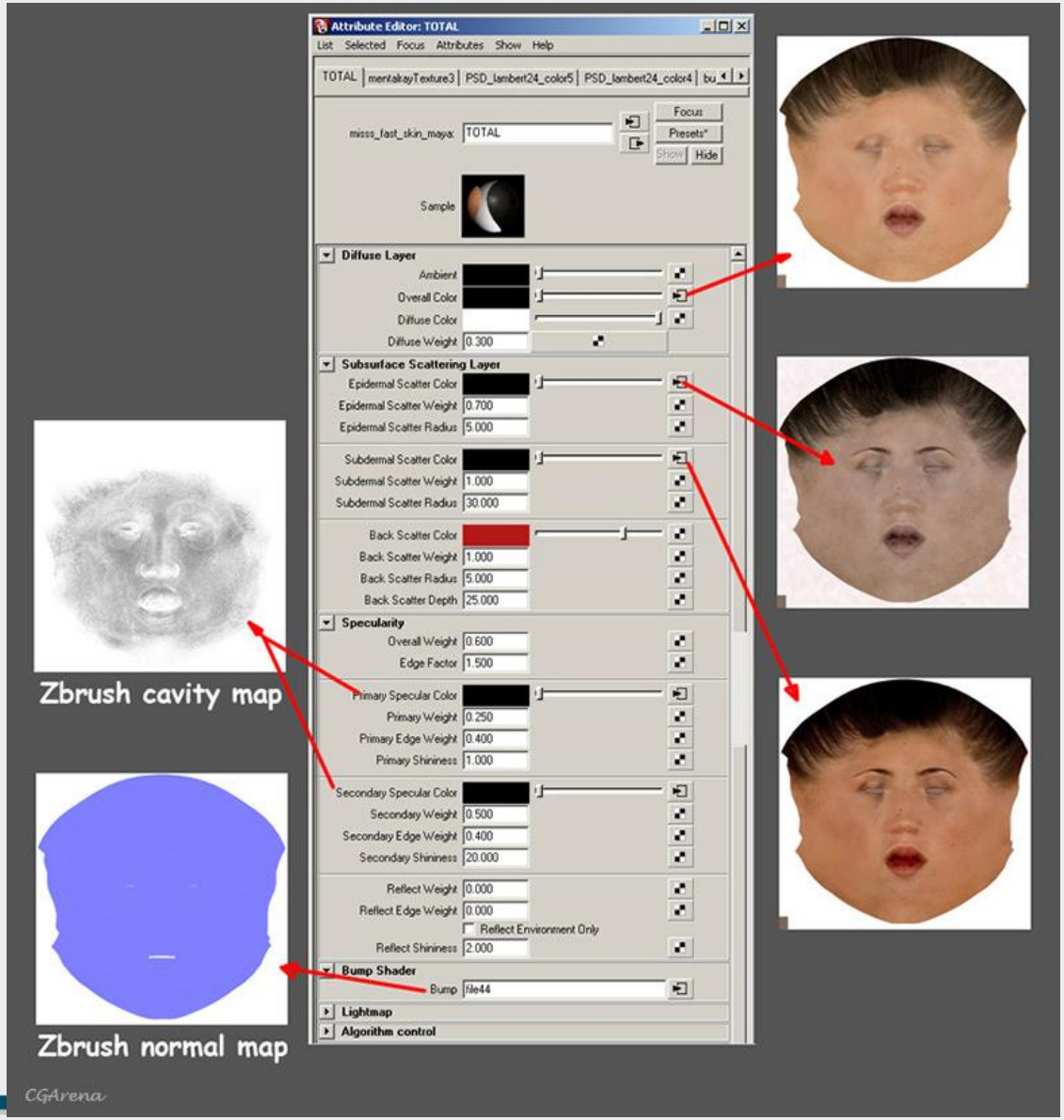


SET UP LIGHTING

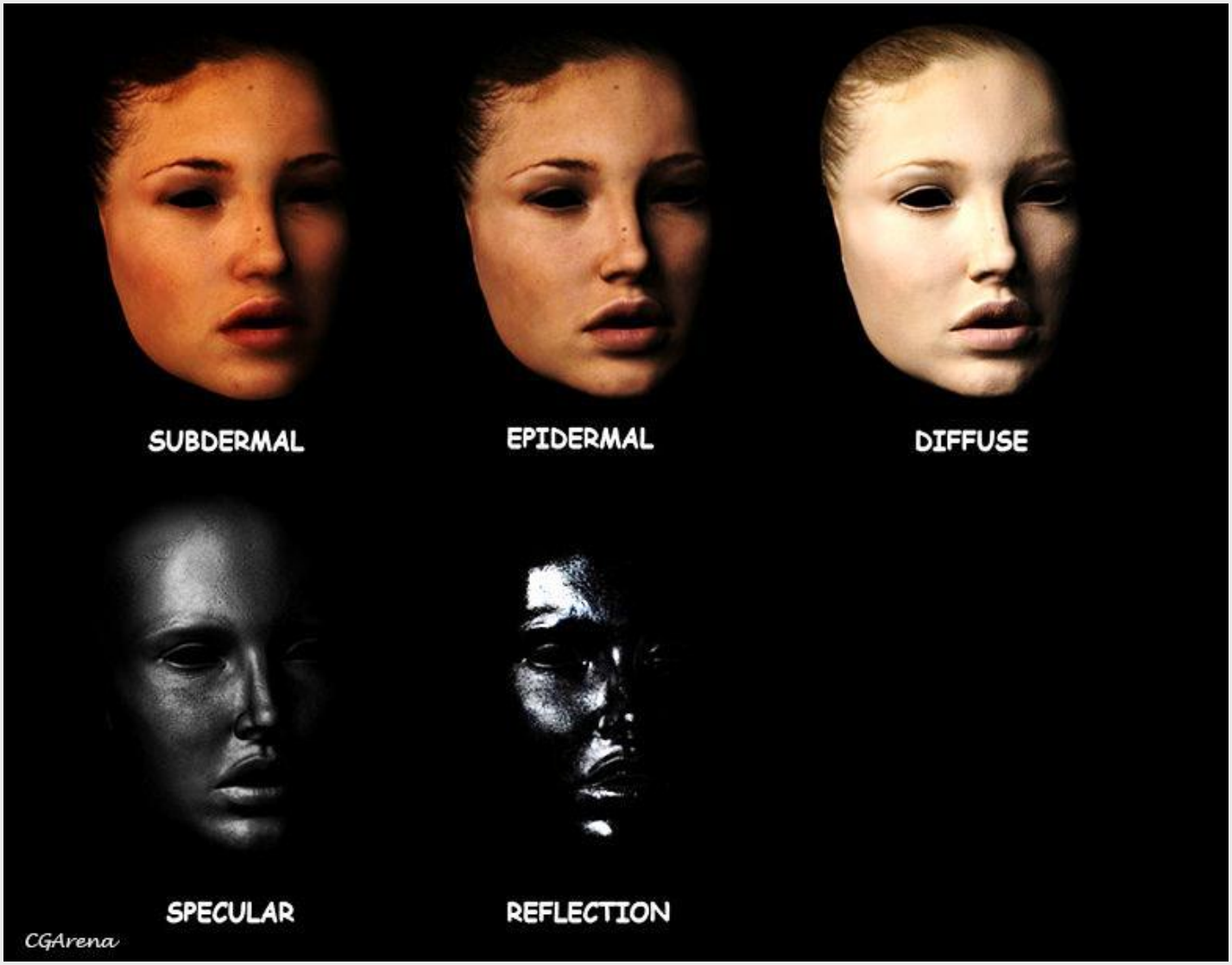




CREATE A COMPLEX MATERIAL



DIFFERENT MATERIAL LAYERS



CREATE HAIR SYSTEM

RENDERING + COMPOSITION