

i s t a n b u l t e c h n i c a l u n i v e r s i t y
a r c h i t e c t u r a l d e s i g n c o m p u t i n g g r a d u a t e p r o g r a m
dads 2011: a springtime venture

The Digital Shape or...

Mind the Gap Reloaded!

Lecture VI
Digital 3D Object Models

Ceyhun Burak Akgül, PhD
www.cba-research.com

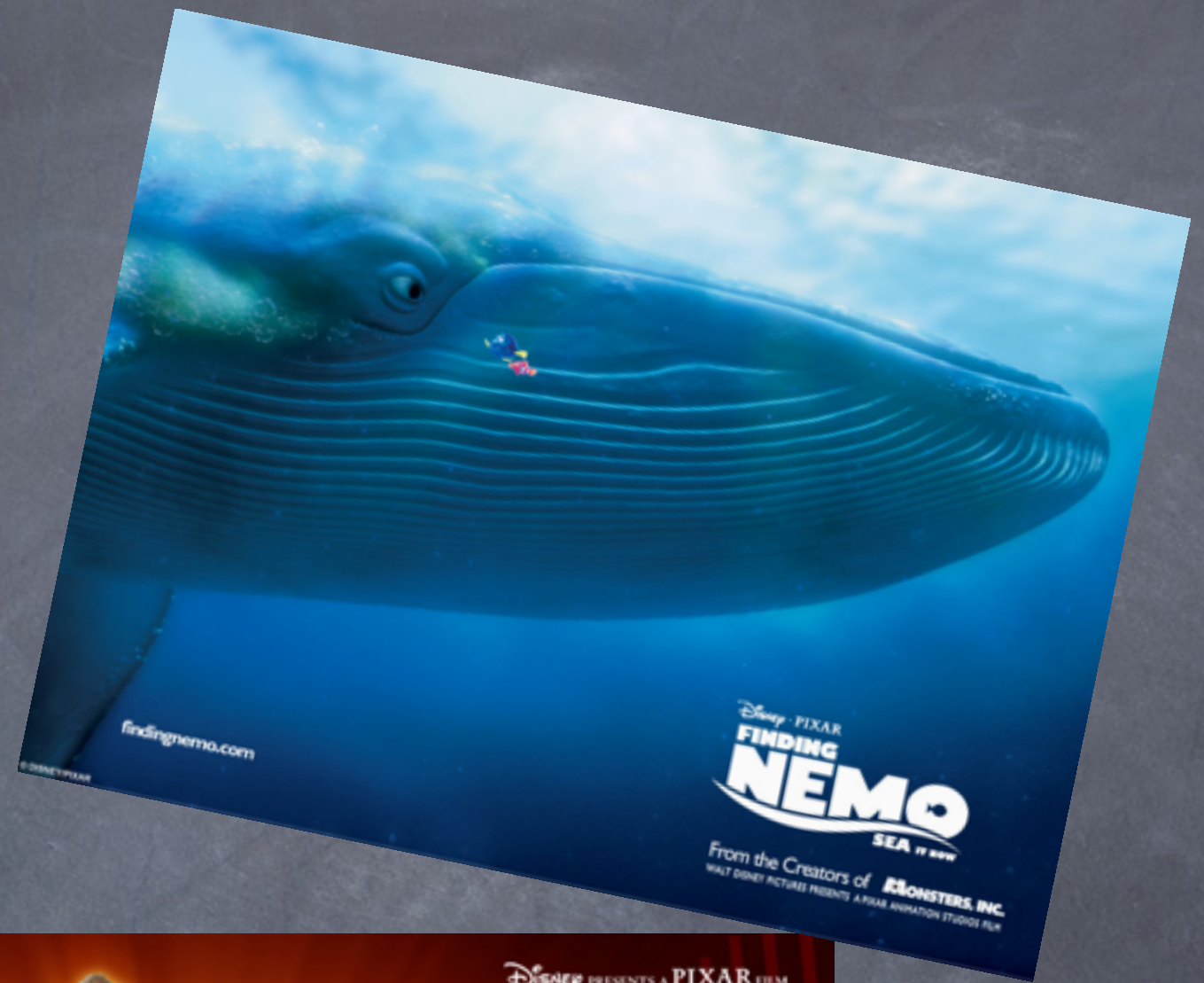
3D Models

- **3D Modeling** is the process of mathematically representing the **surface** of an object in 3D.
- A 3D model represents a 3D object using a collection of points connected by various geometrical entities such as
 - lines
 - triangles
 - curved surface patches
 - ...
- A 3D model can be created
 - by hand
 - algorithmically (procedural modeling)
 - by scanning

Application Areas

- Movie industry
- Video games industry
- Medical industry
- Molecular biology
- Mechanical engineering
- Geography
- Industrial Design
- Architecture
- ...

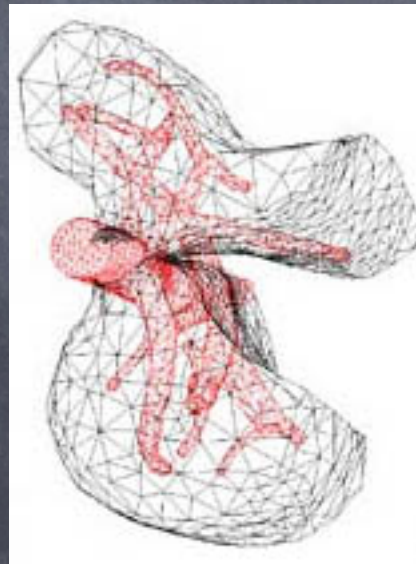
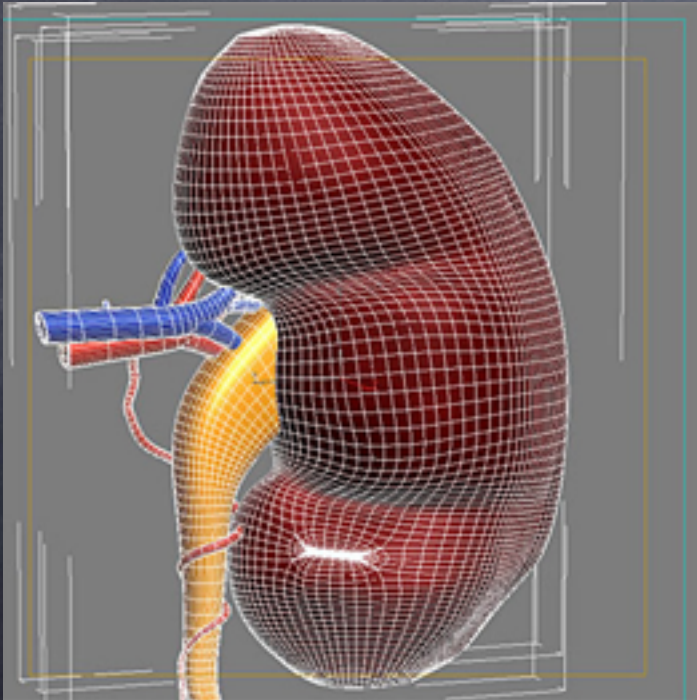
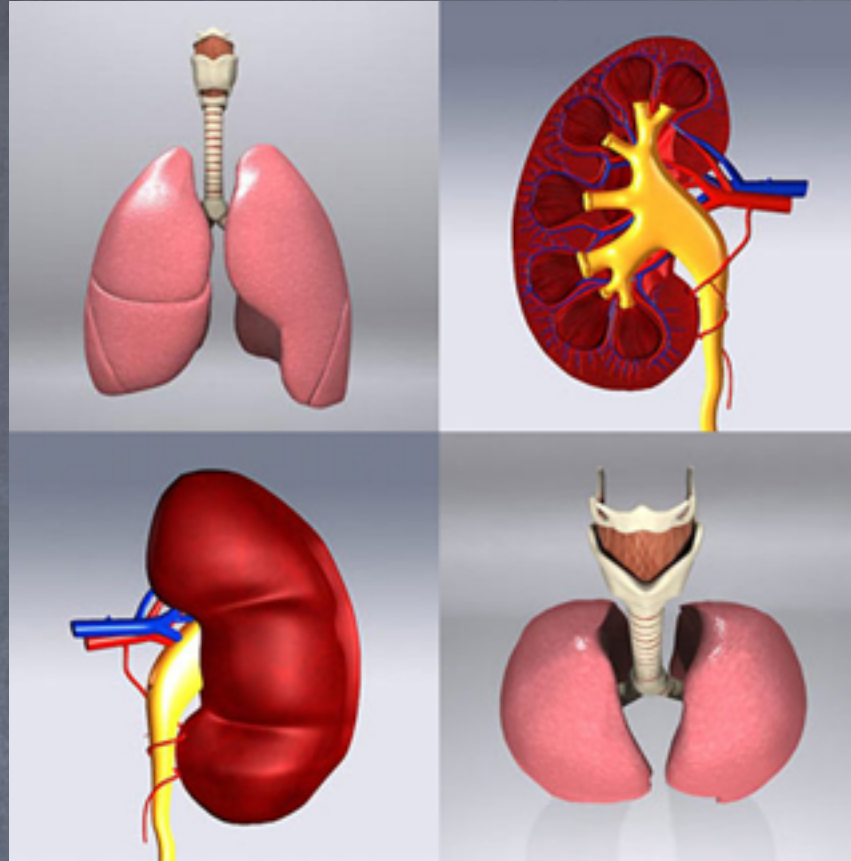
Movie Industry



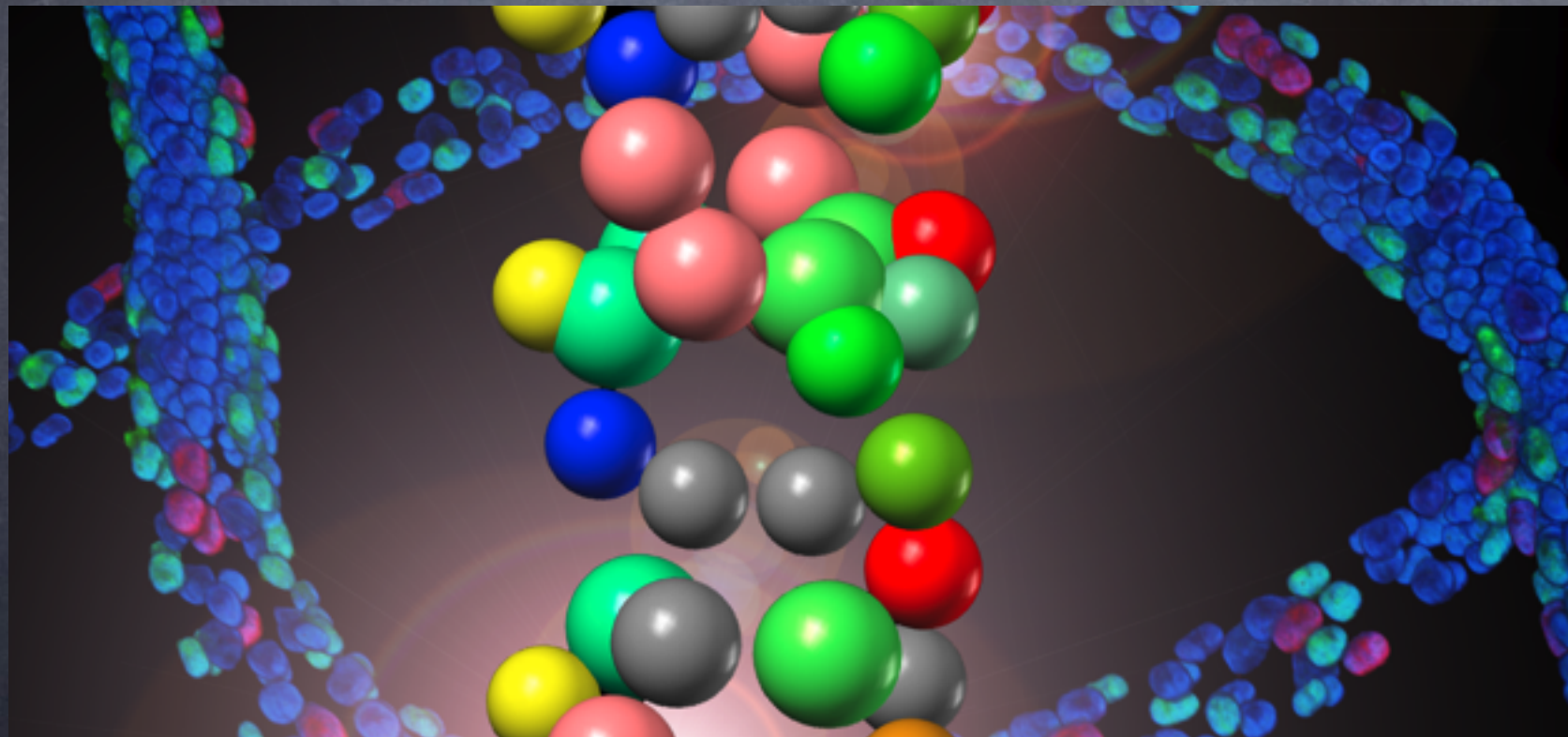
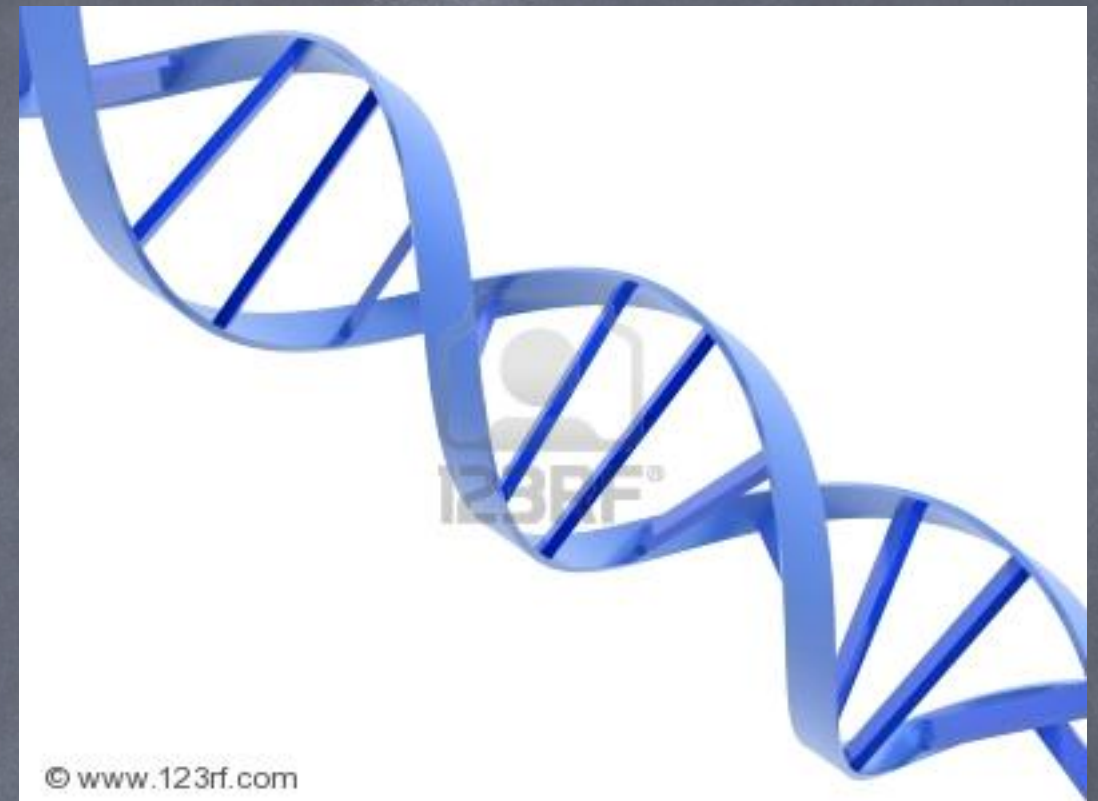
Video Games



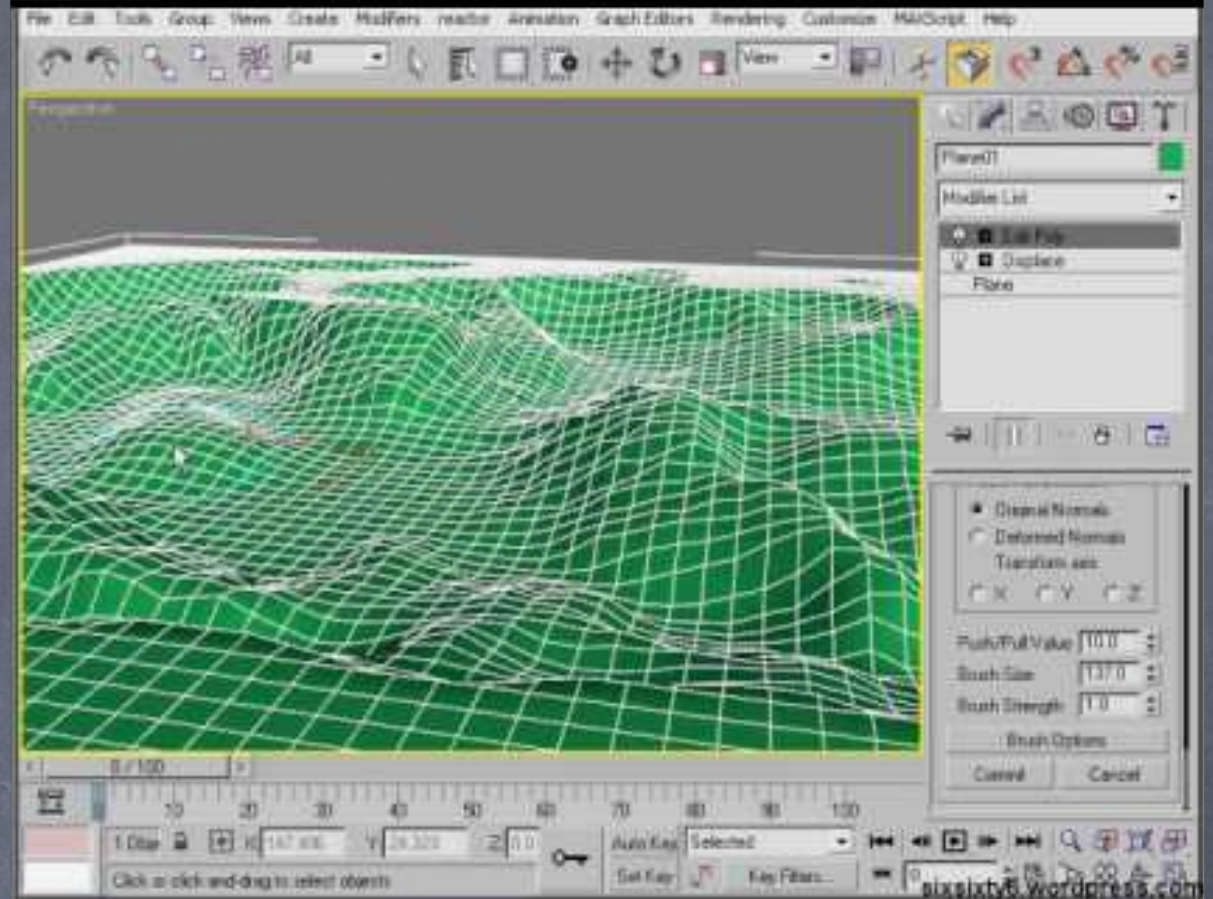
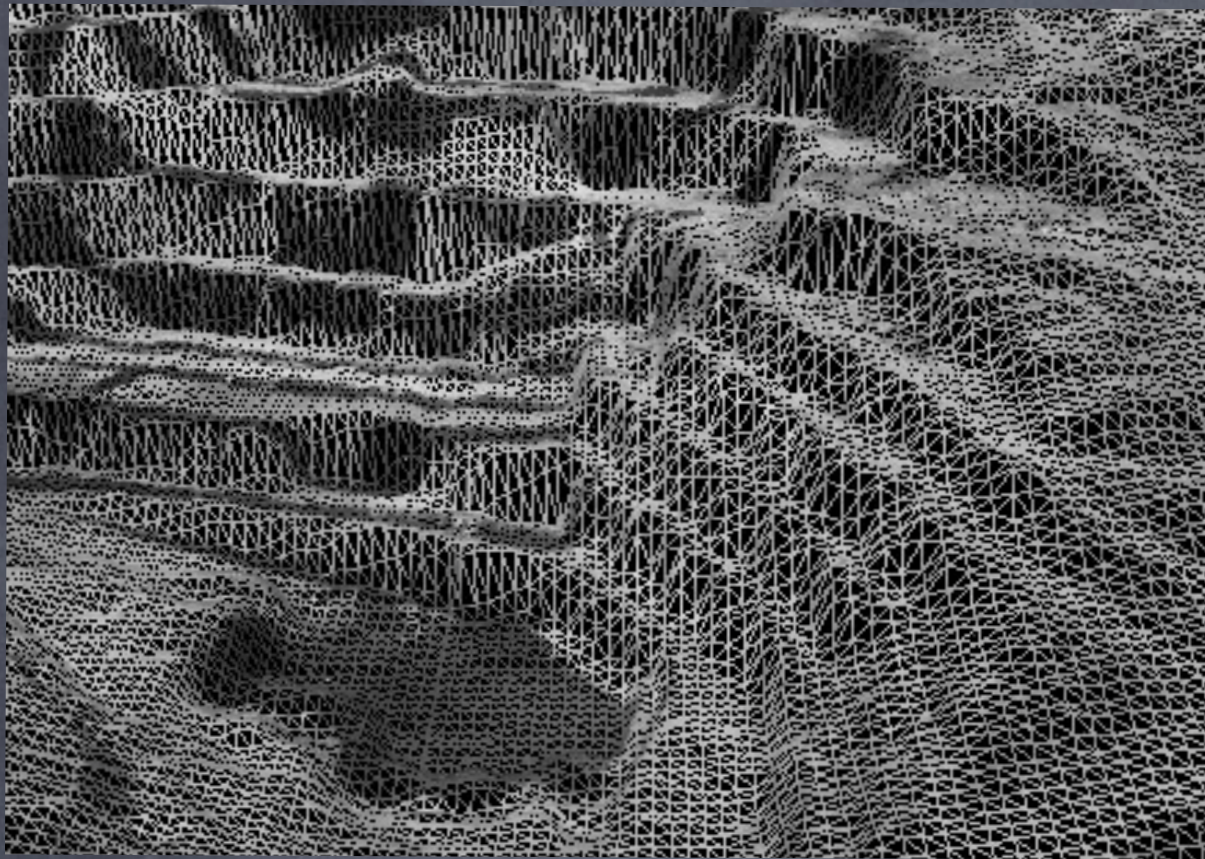
Medical



Molecular Biology



Digital Terrain Modeling



Representation

- Solid
 - Define **volume**
 - More realistic but difficult to build
 - Mostly used in medical and engineering simulations
 - Based on **constructive solid geometry**
- Shell/Boundary
 - Define **surface** not the volume
 - Infinitesimally thin shell
 - Film and video industry, industrial design, architecture, GIS
 - Based mostly on **polygonal meshing, NURBS**

Processes & Techniques

- **Polygonal meshing**
- **NURBS**
- Splines & Patches
- **Primitives modeling**
- Sculpting
- **Constructive solid geometry**
- Implicit surfaces
- **Subdivision surfaces**



Yet to
come!

3D Software



**Yet to
come !**