

COMPUTER GRAPHICS

LECTURE 01

COURSE INSTRUCTOR: MAHAM KHAN

Recommended Books

- ▶ Introduction to COMPUTER GRAPHICS by Anirban Mukhopadhyay , Arup Chattopadhyay
- ▶ Fundamentals of Computer Graphics Third Edition by Peter Shirley and Steve Marschner

Learning Outcome

- ▶ After successful completion a student should be able to
 - ▶ identify various application areas of the graphics
 - ▶ define basic terminology of computer graphics
 - ▶ differentiate various graphic areas
 - ▶ characterize output and input devices for their effective use in the area
 - ▶ understand and use various transformations
 - ▶ construct elementary shapes on computer
 - ▶ generate 3-D models on computer

What are Computer Graphics

- ▶ The study of using computers to create and manipulate images is called **Computer Graphics**
- ▶ In true sense the subject requires rigorous background in Linear Algebra especially Matrices.



Areas

Graphics Areas

- ▶ **The area of Computer graphics that** deals with the mathematical specification of shape and appearance properties in a way that can be stored on the computer is called **Modeling**.
- ▶ The creation of shaded images from 3D computer models is called **Rendering**.
- ▶ Modeling of interaction of light with matter is called **Illumination**.
- ▶ The technique to create an illusion of motion through sequences of images is referred to as **Animation**.

Why Computer Graphics

- ▶ With emergence of usage of computers in almost every wake of life, the area of Computer Graphics has earned huge importance because of its utility and simplicity.

Applications

Entertainment

- ▶ Video Games
- ▶ Cartoons
- ▶ Animated Films

Video Games



Polyphony Digital: Gran Turismo 3, A Spec

Entertainment

- ▶ Video Games
- ▶ Cartoons
- ▶ Animated Films

Cartoons



Pixar: Monster's Inc.



A Bug's Life (Pixar)

Entertainment

- ▶ Video Games
- ▶ Cartoons
- ▶ **Animated Films**

Animated Films

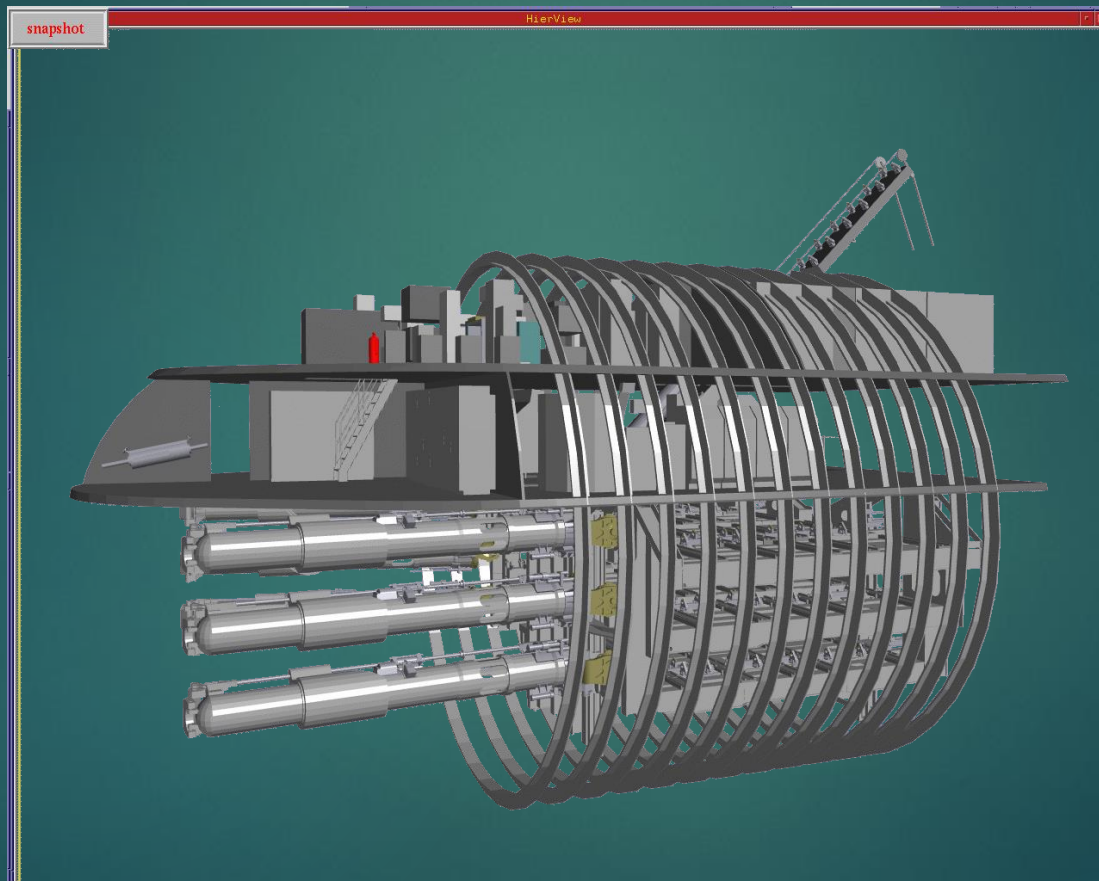


Final Fantasy (Square, USA)

Industry

- ▶ CAD/CAM: These fields use computer technology to design parts and products on the computer and then, using these virtual designs, to guide the manufacturing process.
 - ▶ AutoCAD from AutoDesk
 - ▶ Microsoft Visio
 - ▶ Adobe's Photoshop etc.

CAD/CAM



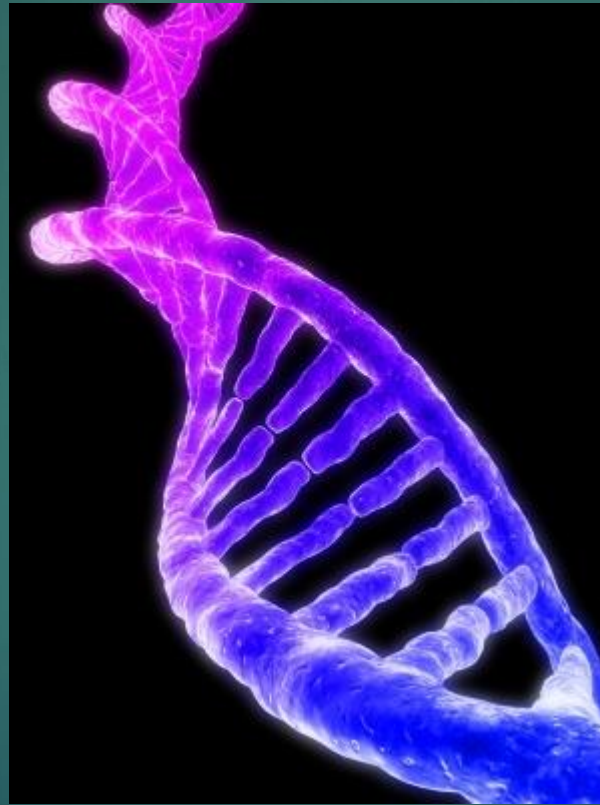
Simulations

- ▶ Can be taken as accurate video games
 - ▶ Flight Simulator
 - ▶ Power Plant Simulator
 - ▶ Firefighter Simulator

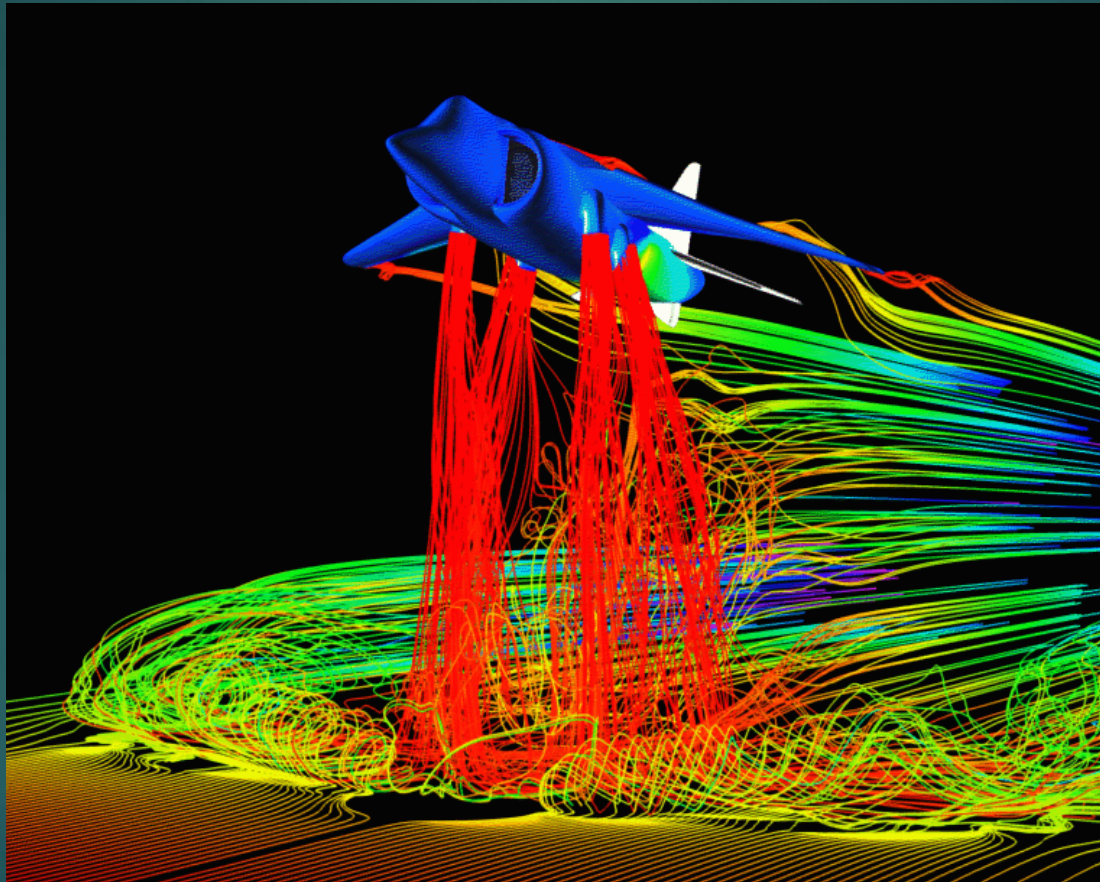
Medicine

- ▶ Medical Imaging
 - ▶ Meaningful images of patients scanned data
 - ▶ MRI
 - ▶ CT Scan
- ▶ Guided Surgery

Scientific Visualization

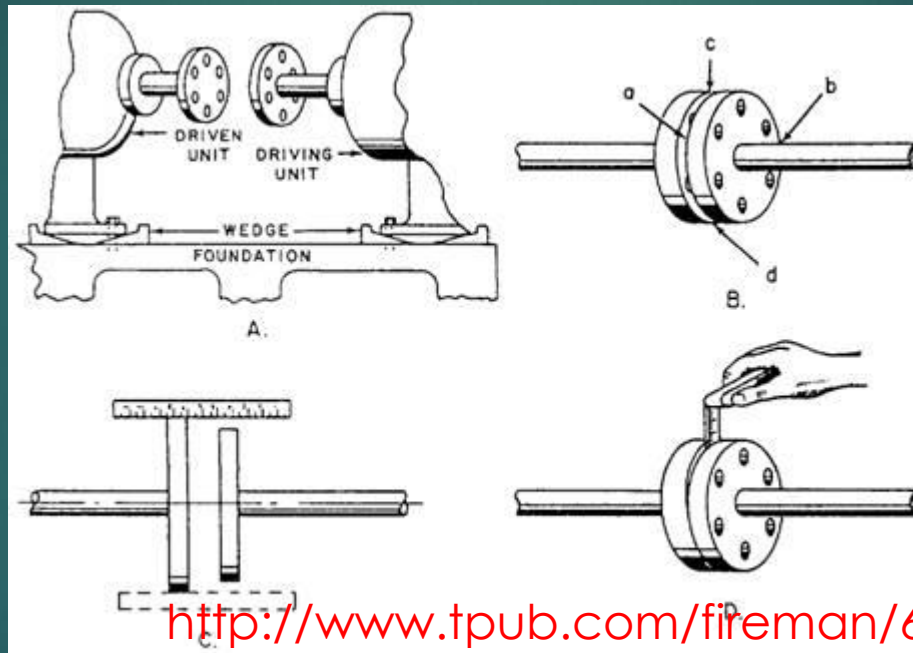


Scientific Visualization

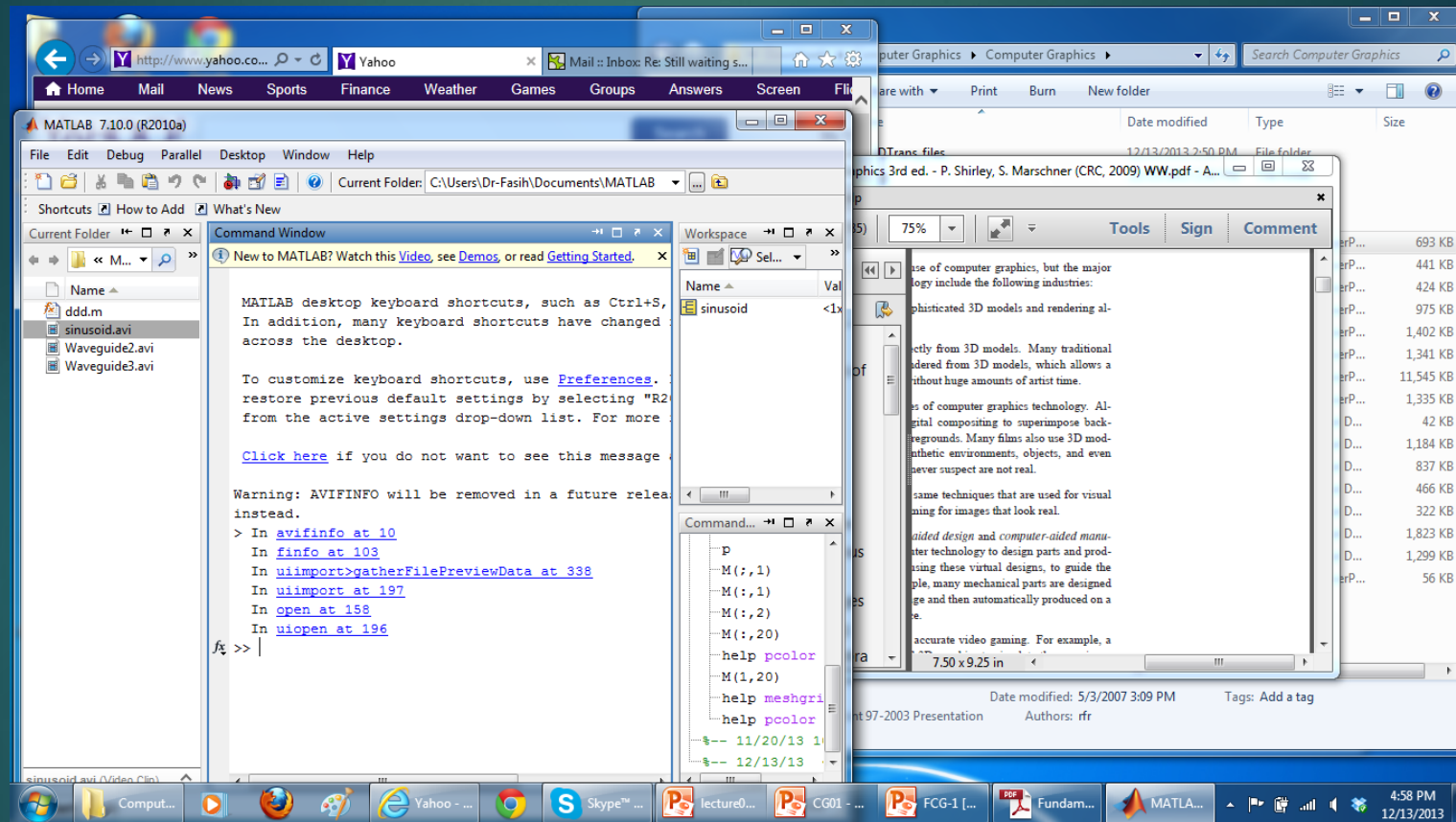


Airflow around a Harrier Jet (NASA Ames)

Education and Training



Everyday Uses



Summary

- ▶ What is Computer Graphics
- ▶ Areas
- ▶ Applications

References

- ▶ Fundamentals of Computer Graphics Third Edition
by Peter Shirley and Steve Marschner