

# **INTRODUCTION TO COMPUTER GRAPHICS**

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# WHAT IS COMPUTER GRAPHICS? (1/2)

- Definition
  - Producing pictures or images using a computer
- Example
  - Starship Troopers: Tango-Urilla, Death From Above



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    - On set: Pyrotechnics



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    - Bugs:



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    - The Final Stage: Burning the bugs



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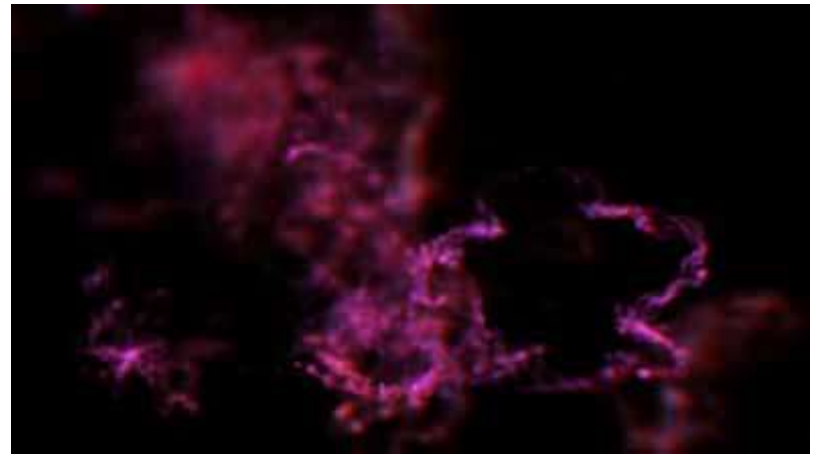
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*Courtesy of Buf Compagnie*



# WHAT IS COMPUTER GRAPHICS? (2/2)

- Imaging
  - Representing 2D images
- Modeling
  - Representing 3D objects
- Rendering
  - Constructing 2D images from 3D models
- Animation
  - Simulating changes over time



# APPLICATIONS

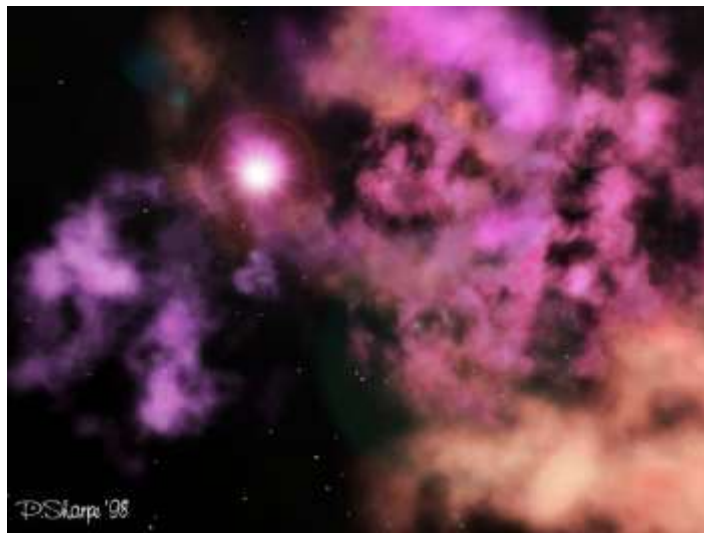
- Display of Information
- Design
- Simulation
- Computer Art
- Entertainment





# DISPLAY OF INFORMATION

- Graphics for Scientific, Engineering, and Medical Data



Nebula

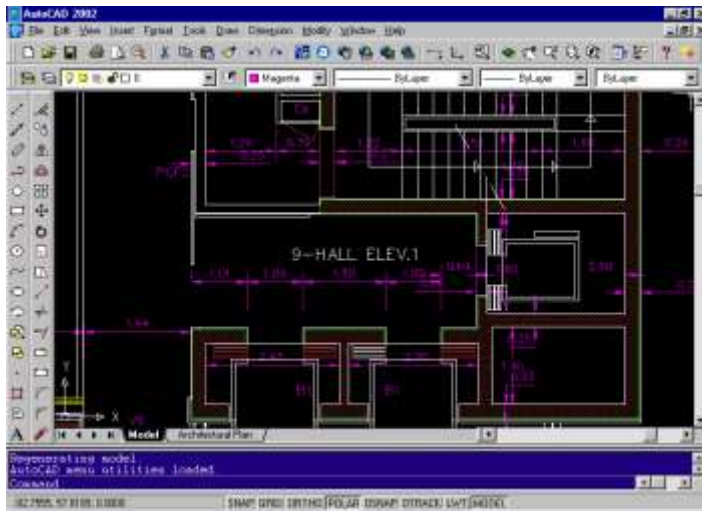


Medical Image



# DESIGN

- Graphics for Engineering and Architectural System
- Design of Building, Automobile, Aircraft, Machine etc.



AutoCAD 2002



Interior Design



# SIMULATION

- Computer-Generated Models of Physical, Financial and Economic Systems for Educational Aids



Flight Simulator



Mars Rover Simulator



# COMPUTER ART

- Graphics for Artist



Metacreation Painter





# ENTERTAINMENT

- Graphics for Movie, Game, VR etc.



Final Fantasy



Online Game



# WHAT'S OUR SCOPE?

- **Not a Tutorial on Commercial Software**
  - 3DMax, Maya, Photoshop, etc.
- **Not about Graphics Business**
  - 3D online-game, E-commerce, etc.
- **Graphics = Algorithm for Visual Simulation**
  - Imaging, Modeling, Rendering, Animation





# IMAGING

- **Warping**
- **Metamorphosis**
- **Non-Photorealistic Rendering**



# MODELING

- Surface Modeling
- Solid Modeling
- Procedure Modeling
- Simplification



# RENDERING

- Polygonal Rendering
- Global Rendering
- Texture Mapping



# ANIMATION

- Keyframe Animation
- Inverse Kinematics
- Dynamics
- Motion Capture

