## What is Computer Graphics?



## What is Computer Graphics (CG)?

- Science and art of visual communication via the computer
- CG is highly cross disciplinary:

CG = Physics + Mathematics + Human perception $+\mathrm{HCl}+$ Engineering + Art

## Graphics Areas



Creation of illusion of motion through sequence of images

Creation of shaded images from models

## CG in Entertainment

Video games


## CG in Entertainment

Film special effects (VFX)


VFXVideo


## CG in CAD/CAM



Source: http://autocad-architecture-blog.com/how-to/how-to-start-project/


Source: http://renderingofarchitecture.com/3d-visualisation-urban-planning-almeria


Source: http://www.3shapedental.com/pressreleases/3shape-launches-implant-studio/


Source: http://medspark.ms/Technical-Glossary-All.php

## CAD/CAM: Computer Aided Design/ Computer Aided Manufacturing

## CG in Simulation



Source: http://http.developer.nvidia.com/GPUGems3/gpugems3_ch30.html

## CG in Medical Imaging



## What is required in Graphics?

- Core concepts from Mathematics (calculus, geometry, algebra, differential equations, numerical methods )
- Core concepts from Physics ( basic laws, optics, electromagnetism)
- Core concepts from Computer Science (Data structures, algorithms) and lots of programming!


## What to learn in Graphics?

## Graphics APIs

## - OpenGL <br> - DirectX



## 2D/3D Transformations



## Nienin



## Lighting and Shading



## Texturing



## Curves and Surfaces




## Ray Tracing



## Photorealistic

## Rendering



## and much more...



