

Computer Graphics

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Course www: <http://isg.cs.tcd.ie/cosulliv/>

Intro

- BA Computer Science / BAI Engineering / Maths
- CS4052 / CS4D3A
- 5 ECTS
- Michaelmas wks 1-12
 - Reading week 7-11th November
- Schedule
 - Mon 3-4 Lecture 1
 - Tues 11-12 Lecture 2 (sometimes Lab)
 - Tues 12-1 Lab

Course Topics

- An introduction to computer graphics; problem domain and applications;
- Modelling - data sources and acquisition; modelling software; representation schemes;
- Linear algebra - two and three dimensional transforms; geometric operations; hierarchical 3D transformations;
- The computer graphics pipeline and the OpenGL API for 3D computer graphics;
- Projection and viewing; window to viewport transformation;
- Illumination models and rendering algorithms; colour, shading algorithms (Gouraud and Phong), local and global illumination;

Assessment

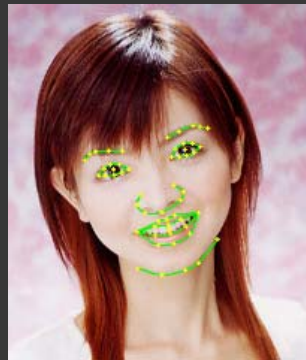
- Project (20%)
 - Will be developed in increments throughout
- Exam (80%)
 - end Semester 1 (CS), end Semester 2 (BAI)

Visual Computing

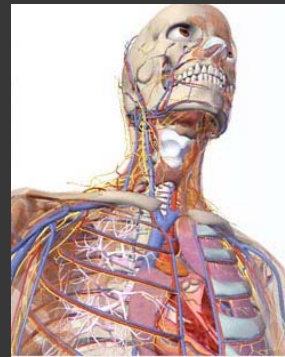
Graphics



Vision



Visualisation



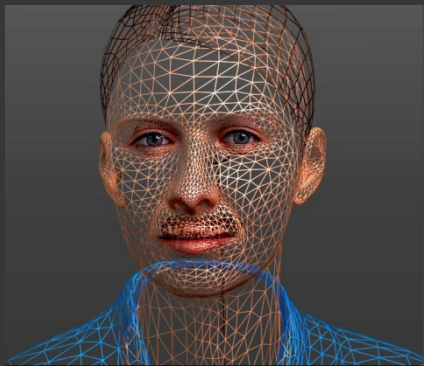
Virtual Reality



Using computers both to generate visual images synthetically and to integrate or alter visual and spatial information sampled from the real world

Graphics

Modelling



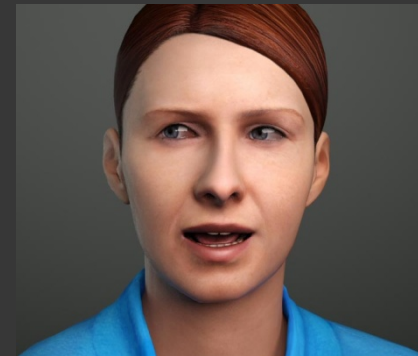
creating, or capturing the representation of objects – most often geometrical

Rendering



creating an image of these objects on a display device

Animation



making objects move by describing how they change over time

Related Areas

- Maths and Physics
- Biology, Physiology, Biomechanics
- Engineering
- Presence/Immersive Virtual Reality (VR)
- Haptics, Audio
- Artificial Intelligence, Psychology, Perception
- Image Processing
 - Image enhancement
 - Image analysis
 - Image data compression
- ...

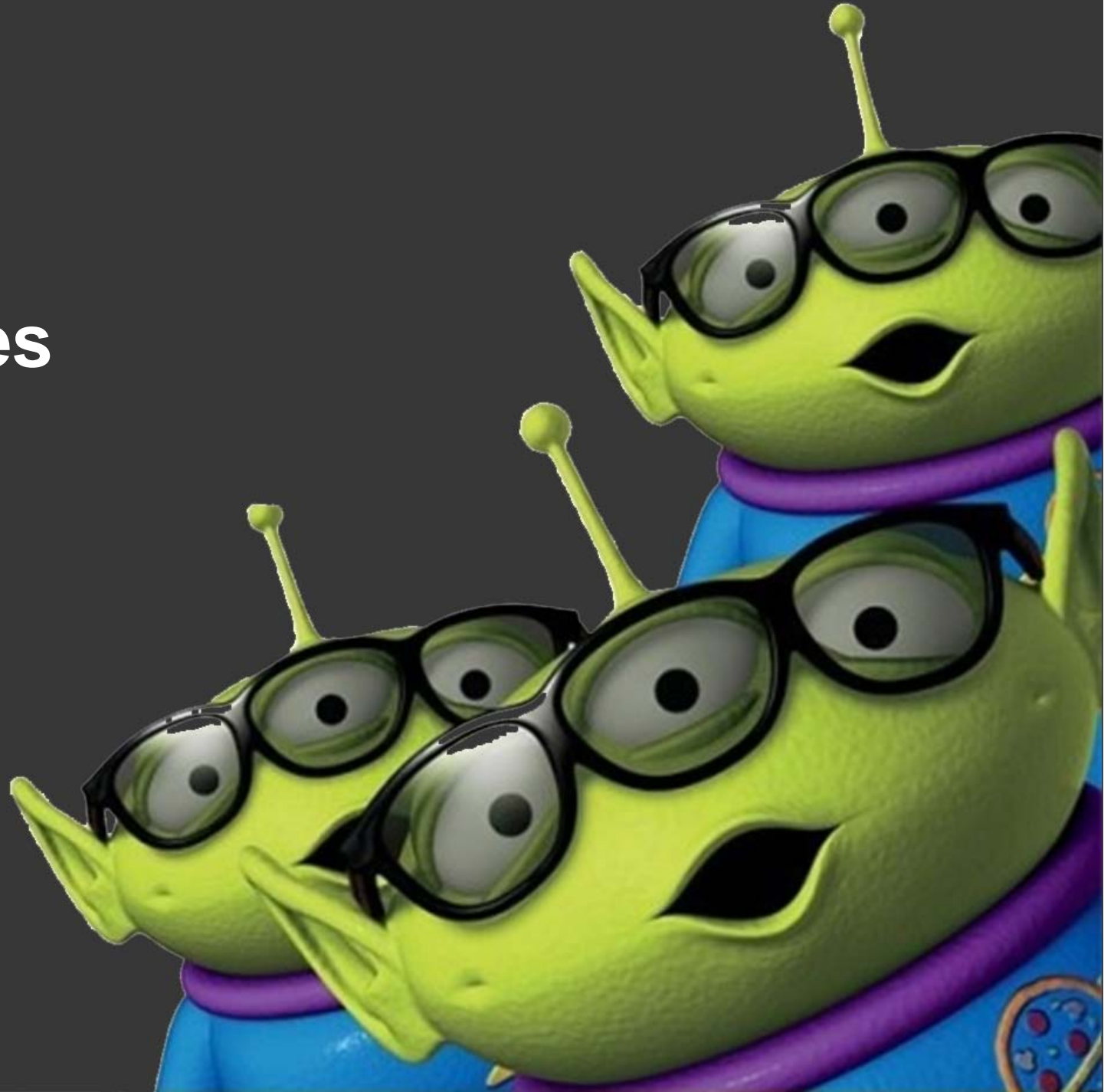
Computer Graphics

- a few questions

- 2D or 3D?
- Photo-realistic or NPR?
- Real-time or Offline?
- Rigid or Deformable?
- Interactive or Pre-determined?
- Real or Abstract?
- Geometric or Image-based?
- Hardware or Software?
- ...?

Applications

Movies









Games



The SIMS³





SpongeBob
SCHWAMMKOPF



NICK

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Architectural Design



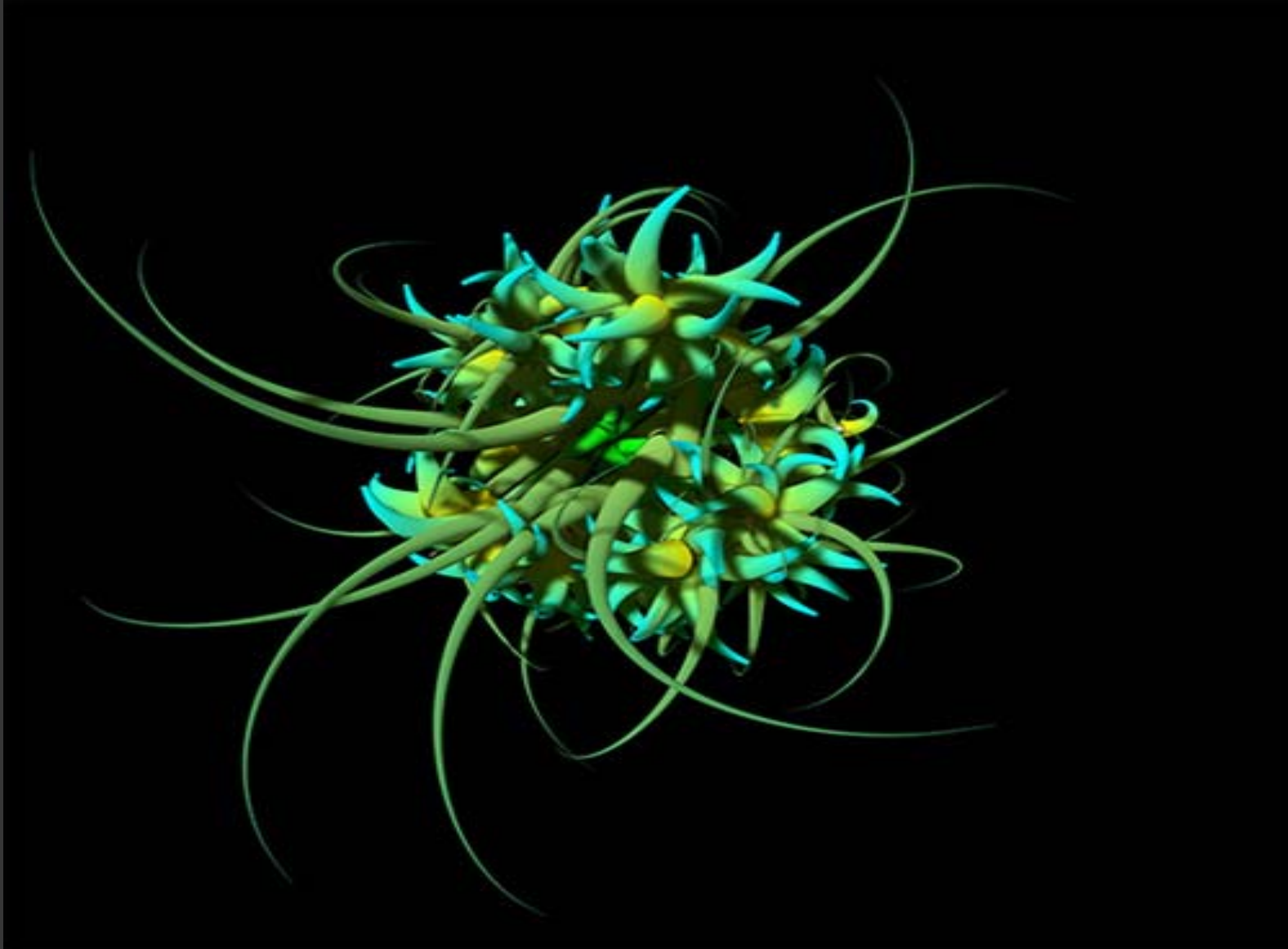
Product Design



Natural Phenomena



Scientific Visualisation



Cultural Heritage



Medicine

